

SEQUENCE LISTING

<110> Yocum, R. et al.

<120> MICROORGANISMS AND ASSAYS FOR THE IDENTIFICATION OF
ANTIBIOTICS

<130> OGZ-001

<140>

<141>

<150> US 60/227,860

<151> 2000-08-24

<160> 76

<170> PatentIn Ver. 2.0

<210> 1

<211> 777

<212> DNA

<213> Bacillus subtilis

<220>

<221> CDS

<222> (1)..(774)

<400> 1

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| ttg tta ctg gtt atc gat gtg ggg aac acc aat act gta ctt ggt gta | 48 |
| Leu Leu Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val | |
| 1 5 10 15 | |

| | |
|---|----|
| tat cat gat gga aaa tta gaa tat cac tgg cgt ata gaa aca agc agg | 96 |
| Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg | |
| 20 25 30 | |

| | |
|---|-----|
| cat aaa aca gaa gat gag ttt ggg atg att ttg cgc tcc tta ttt gat | 144 |
| His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp | |
| 35 40 45 | |

| | |
|---|-----|
| cac tcc ggg ctt atg ttt gaa cag ata gat ggc att att att tcg tca | 192 |
| His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser | |
| 50 55 60 | |

| | |
|---|-----|
| gta gtg ccg cca atc atg ttt gcg tta gaa aga atg tgc aca aaa tac | 240 |
| Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr | |
| 65 70 75 80 | |

| | |
|---|-----|
| ttt cat atc gag cct caa att gtt ggt cca ggt atg aaa acc ggt tta | 288 |
| Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu | |
| 85 90 95 | |

| | |
|---|-----|
| aat ata aaa tat gac aat ccg aaa gaa gta ggg gca gac aga atc gta | 336 |
| Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val | |
| 100 105 110 | |

| | |
|---|-----|
| aat gct gtc gct gcg ata cac ttg tac ggc aat cca tta att gtt gtc | 384 |
|---|-----|

Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val
 115 120 125
 gat ttc gga acc gcc aca acg tac tgc tat att gat gaa aac aaa caa 432
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln
 130 135 140
 tac atg ggc ggg gcg att gcc cct ggg att aca att tcg aca gag gcg 480
 Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala
 145 150 155 160
 ctt tac tcg cgt gca gca aag ctt cct cgt atc gaa atc acc cgg ccc 528
 Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro
 165 170 175
 gac aat att atc gga aaa aac act gtt agc gcg atg caa tct gga att 576
 Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile
 180 185 190
 tta ttt ggc tat gtc ggc caa gtg gaa gga atc gtt aag cga atg aaa 624
 Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys
 195 200 205
 tgg cag gca aaa cag gac ctc aag gtc att gcg aca gga ggc ctg gcg 672
 Trp Gln Ala Lys Gln Asp Leu Lys Val Ile Ala Thr Gly Gly Leu Ala
 210 215 220
 ccg ctc att gcg aac gaa tca gat tgt ata gac atc gtt gat cca ttc 720
 Pro Leu Ile Ala Asn Glu Ser Asp Cys Ile Asp Ile Val Asp Pro Phe
 225 230 235 240
 tta acc cta aaa ggg ctg gaa ttg att tat gaa aga aac cgc gta gga 768
 Leu Thr Leu Lys Gly Leu Glu Leu Ile Tyr Glu Arg Asn Arg Val Gly
 245 250 255
 agt gta tag 777
 Ser Val
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 20 25 30
 His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp
 35 40 45
 His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser
 50 55 60
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr
 65 70 75 80
 Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu

"ESTHER" 1350

| 85 | | | | | 90 | | | | | 95 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Ile | Lys | Tyr | Asp | Asn | Pro | Lys | Glu | Val | Gly | Ala | Asp | Arg | Ile | Val |
| | | 100 | | | | | | 105 | | | | | 110 | | |
| Asn | Ala | Val | Ala | Ala | Ile | His | Leu | Tyr | Gly | Asn | Pro | Leu | Ile | Val | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Phe | Gly | Thr | Ala | Thr | Thr | Tyr | Cys | Tyr | Ile | Asp | Glu | Asn | Lys | Gln |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Tyr | Met | Gly | Gly | Ala | Ile | Ala | Pro | Gly | Ile | Thr | Ile | Ser | Thr | Glu | Ala |
| | 145 | | | | | 150 | | | | | 155 | | | | 160 |
| Leu | Tyr | Ser | Arg | Ala | Ala | Lys | Leu | Pro | Arg | Ile | Glu | Ile | Thr | Arg | Pro |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Asp | Asn | Ile | Ile | Gly | Lys | Asn | Thr | Val | Ser | Ala | Met | Gln | Ser | Gly | Ile |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Phe | Gly | Tyr | Val | Gly | Gln | Val | Glu | Gly | Ile | Val | Lys | Arg | Met | Lys |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Trp | Gln | Ala | Lys | Gln | Asp | Leu | Lys | Val | Ile | Ala | Thr | Gly | Gly | Leu | Ala |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Pro | Leu | Ile | Ala | Asn | Glu | Ser | Asp | Cys | Ile | Asp | Ile | Val | Asp | Pro | Phe |
| | 225 | | | | | 230 | | | | | 235 | | | | 240 |
| Leu | Thr | Leu | Lys | Gly | Leu | Glu | Leu | Ile | Tyr | Glu | Arg | Asn | Arg | Val | Gly |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ser | Val | | | | | | | | | | | | | | |

<210> 3

<211> 250

<212> PRT

<213> Clostridium acetobutylicum

<400> 3

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Lys | Arg | Ala | Ala | Phe | Met | Leu | Leu | Leu | Phe | Leu | Arg | Ser | Val | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Val | Ile | Leu | Val | Leu | Asp | Val | Gly | Asn | Thr | Asn | Ile | Val | Leu | Gly |
| | | 20 | | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Tyr | Asn | Asp | Thr | Lys | Leu | Thr | Ala | Glu | Trp | Arg | Leu | Ser | Thr | Asp |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Leu | Arg | Ser | Ala | Asp | Glu | Tyr | Gly | Ile | Gln | Val | Met | Asn | Leu | Phe |
| | 50 | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Gln | Asp | Lys | Leu | Asp | Pro | Thr | Leu | Val | Glu | Gly | Val | Ile | Ile | Ser |
| | 65 | | | | 70 | | | | | 75 | | | | | 80 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Val | Val | Pro | Asn | Ile | Met | Tyr | Ser | Leu | Glu | His | Met | Ile | Arg | Lys |
| | | | | 85 | | | | | 90 | | | | | 95 | |

Tyr Phe Lys Ile Asn Pro Leu Val Val Gly Pro Gly Ile Lys Thr Gly

```

<210> 4
<211> 265
<212> PRT
<213> Streptomyces coelicolor

<400> 4
Met Leu Leu Thr Ile Asp Val Gly Asn Thr His Thr Val Leu Gly Leu
 1             5             10             15
Phe Asp Gly Glu Asp Ile Val Glu His Trp Arg Ile Ser Thr Asp Ser
          20             25             30
Arg Arg Thr Ala Asp Glu Leu Ala Val Leu Leu Gln Gly Leu Met Gly
      35             40             45
Met His Pro Leu Leu Gly Asp Glu Leu Gly Asp Gly Ile Asp Gly Ile
      50             55             60
Ala Ile Cys Ala Thr Val Pro Ser Val Leu His Glu Leu Arg Glu Val
 65             70             75             80
Thr Arg Arg Tyr Tyr Gly Asp Val Pro Ala Val Leu Val Glu Pro Gly
          85             90             95
Val Lys Thr Gly Val Pro Ile Leu Thr Asp His Pro Lys Glu Val Gly
          100             105             110
Ala Asp Arg Ile Ile Asn Ala Val Ala Ala Val Glu Leu Tyr Gly Gly
      115             120             125
Pro Ala Ile Val Val Asp Phe Gly Thr Ala Thr Thr Phe Asp Ala Val

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130 135 140
 Ser Ala Arg Gly Glu Tyr Ile Gly Gly Val Ile Ala Pro Gly Ile Glu
 145 150 155 160
 Ile Ser Val Glu Ala Leu Gly Val Lys Gly Ala Gln Leu Arg Lys Ile
 165 170 175
 Glu Val Ala Arg Pro Arg Ser Val Ile Gly Lys Asn Thr Val Glu Ala
 180 185 190
 Met Gln Ser Gly Ile Val Tyr Gly Phe Ala Gly Gln Val Asp Gly Val
 195 200 205
 Val Asn Arg Met Ala Arg Glu Leu Ala Asp Asp Pro Asp Asp Val Thr
 210 215 220
 Val Ile Ala Thr Gly Gly Leu Ala Pro Met Val Leu Gly Glu Ser Ser
 225 230 235 240
 Val Ile Asp Glu His Glu Pro Trp Leu Thr Leu Met Gly Leu Arg Leu
 245 250 255
 Val Tyr Glu Arg Asn Val Ser Arg Met
 260 265

<210> 5

<211> 272

<212> PRT

<213> Mycobacterium tuberculosis

<400> 5

Met Leu Leu Ala Ile Asp Val Arg Asn Thr His Thr Val Val Gly Leu
 1 5 10 15
 Leu Ser Gly Met Lys Glu His Ala Lys Val Val Gln Gln Trp Arg Ile
 20 25 30
 Arg Thr Glu Ser Glu Val Thr Ala Asp Glu Leu Ala Leu Thr Ile Asp
 35 40 45
 Gly Leu Ile Gly Glu Asp Ser Glu Arg Leu Thr Gly Thr Ala Ala Leu
 50 55 60
 Ser Thr Val Pro Ser Val Leu His Glu Val Arg Ile Met Leu Asp Gln
 65 70 75 80
 Tyr Trp Pro Ser Val Pro His Val Leu Ile Glu Pro Gly Val Arg Thr
 85 90 95
 Gly Ile Pro Leu Leu Val Asp Asn Pro Lys Glu Val Gly Ala Asp Arg
 100 105 110
 Ile Val Asn Cys Leu Ala Ala Tyr Asp Arg Phe Arg Lys Ala Ala Ile
 115 120 125
 Val Val Asp Phe Gly Ser Ser Ile Cys Val Asp Val Val Ser Ala Lys
 130 135 140
 Gly Glu Phe Leu Gly Gly Ala Ile Ala Pro Gly Val Gln Val Ser Ser

145 150 155 160
 Asp Ala Ala Ala Ala Arg Ser Ala Ala Leu Arg Arg Val Glu Leu Ala
 165 170 175
 Arg Pro Arg Ser Val Val Gly Lys Asn Thr Val Glu Cys Met Gln Ala
 180 185 190
 Gly Ala Val Phe Gly Phe Ala Gly Leu Val Asp Gly Leu Val Gly Arg
 195 200 205
 Ile Arg Glu Asp Val Ser Gly Phe Ser Val Asp His Asp Val Ala Ile
 210 215 220
 Val Ala Thr Gly His Thr Ala Pro Leu Leu Leu Pro Glu Leu His Thr
 225 230 235 240
 Val Asp His Tyr Asp Gln His Leu Thr Leu Gln Gly Leu Arg Leu Val
 245 250 255
 Phe Glu Arg Asn Leu Glu Val Gln Arg Gly Arg Leu Lys Thr Ala Arg
 260 265 270

<210> 6

<211> 258

<212> PRT

<213> Rhodobacter capsulatus

<400> 6

Met Leu Leu Cys Ile Asp Cys Gly Asn Thr Asn Thr Val Phe Ser Val
 1 5 10 15

Trp Asp Gly Thr Asp Phe Ala Ala Thr Trp Arg Ile Ala Thr Asp His
 20 25 30

Arg Arg Thr Ala Asp Glu Tyr Phe Val Trp Leu Asn Thr Leu Met Gln
 35 40 45

Leu Lys Gly Leu Gln Gly Arg Ile Ser Glu Ala Ile Ile Ser Ser Thr
 50 55 60

Ala Pro Arg Val Val Phe Asn Leu Arg Val Leu Cys Asn Arg Tyr Phe
 65 70 75 80

Asp Cys Arg Pro Tyr Val Val Gly Lys Pro Gly Cys Glu Leu Pro Val
 85 90 95

Ala Pro Arg Val Asp Pro Gly Thr Thr Val Gly Pro Asp Arg Leu Val
 100 105 110

Asn Thr Val Ala Gly Tyr Asp Arg His Gly Gly Asp Leu Ile Val Val
 115 120 125

Asp Phe Gly Thr Ala Thr Thr Phe Asp Val Val Ala Pro Asp Gly Ala
 130 135 140

Tyr Ile Gly Gly Val Ile Ala Pro Gly Val Asn Leu Ser Leu Glu Ala
 145 150 155 160

Leu His Met Ala Ala Ala Ala Leu Pro His Val Asp Val Thr Lys Pro

"GCG" CAME-PDB

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<210> 7
<211> 255
<212> PRT
<213> Geobacter sulfurreducens
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| | | | | | | | | | | | | | | | |
|------------|------------|-----------|------------|------------|------------|------------|------------|-----------|------------|------------|------------|------------|-----------|------------|------------|
| <400> 7 | | | | | | | | | | | | | | | |
| Met 1 | Leu | Leu | Val | Ile 5 | Asp | Val | Gly | Asn | Thr 10 | Asn | Ile | Val | Leu | Gly 15 | Ile |
| Tyr | Asp | Gly | Glu 20 | Arg | Leu | Val | Arg | Asp 25 | Trp | Arg | Val | Ser | Thr 30 | Asp | Lys |
| Ala | Arg | Thr 35 | Thr | Asp | Glu | Tyr | Gly 40 | Ile | Leu | Ile | Asn | Glu 45 | Leu | Phe | Arg |
| Leu | Ala 50 | Gly | Leu | Gly | Leu | Asp 55 | Gln | Ile | Arg | Ala | Val 60 | Ile | Ile | Ser | Ser |
| Val 65 | Val | Pro | Pro | Leu | Thr 70 | Gly | Val | Leu | Glu | Arg 75 | Leu | Ser | Leu | Gly | Tyr 80 |
| Phe | Gly | Met | Arg | Pro 85 | Leu | Val | Val | Gly | Pro 90 | Gly | Ile | Lys | Thr | Gly 95 | Met |
| Pro | Ile | Gln | Tyr 100 | Asp | Asn | Pro | Arg | Glu | Val 105 | Gly | Ala | Asp | Arg | Ile | Val |
| Asn | Ala 115 | Val | Ala | Gly | Tyr | Glu | Lys 120 | Tyr | Arg | Thr | Ser | Leu 125 | Ile | Ile | Val |
| Asp 130 | Phe | Gly | Thr | Ala | Thr | Thr 135 | Phe | Asp | Tyr | Val | Asn 140 | Arg | Lys | Gly | Glu |
| Tyr 145 | Cys | Gly | Gly | Ala | Ile 150 | Ala | Pro | Gly | Leu | Val 155 | Ile | Ser | Thr | Glu | Ala 160 |
| Leu | Phe | Gln | Arg | Ala 165 | Ser | Lys | Leu | Pro | Arg 170 | Val | Asp | Ile | Ile | Arg 175 | Pro |
| Ser | Ala | Ile | Ile | Ala | Arg | Asn | Thr | Val | Asn | Ser | Met | Gln | Ala | Gly | Ile |

```
<210> 8
<211> 262
<212> PRT
<213> Deinococcus radiopugnans
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<400> 8
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  1      5      10      15
Val  Leu  Gly  Leu  Ala  Asp  Ala  Ser  Gly  Ala  Leu  Thr  His  Thr  Trp  Arg
      20      25      30
Ile  Arg  Thr  Asn  Arg  Glu  Met  Leu  Pro  Asp  Asp  Leu  Ala  Leu  Gln  Leu
      35      40      45
His  Gly  Leu  Phe  Thr  Leu  Ala  Gly  Ala  Pro  Ile  Pro  Arg  Ala  Ala  Val
      50      55      60
Leu  Ser  Ser  Val  Ala  Pro  Pro  Val  Gly  Glu  Asn  Tyr  Ala  Leu  Ala  Leu
  65      70      75      80
Lys  Arg  His  Phe  Met  Ile  Asp  Ala  Phe  Ala  Val  Ser  Ala  Glu  Asn  Leu
      85      90      95
Pro  Asp  Val  Thr  Val  Glu  Leu  Asp  Thr  Pro  Gly  Ser  Val  Gly  Ala  Asp
      100     105     110
Arg  Leu  Cys  Asn  Leu  Phe  Gly  Ala  Glu  Lys  Tyr  Leu  Gly  Gly  Leu  Asp
      115     120     125
Tyr  Ala  Val  Val  Val  Asp  Phe  Gly  Thr  Ser  Thr  Asn  Phe  Asp  Val  Val
      130     135     140
Gly  Arg  Gly  Arg  Arg  Phe  Leu  Gly  Gly  Ile  Leu  Ala  Thr  Gly  Ala  Gln
  145     150     155     160
Val  Ser  Ala  Asp  Ala  Leu  Phe  Ala  Arg  Ala  Ala  Lys  Leu  Pro  Arg  Ile
      165     170     175
Thr  Leu  Gln  Ala  Pro  Glu  Thr  Ala  Ile  Gly  Lys  Asn  Thr  Val  His  Ala
      180     185     190
Leu  Gln  Ser  Gly  Leu  Val  Phe  Gly  Tyr  Ala  Glu  Met  Val  Asp  Gly  Leu
      195     200     205
Leu  Arg  Arg  Ile  Arg  Ala  Glu  Leu  Pro  Gly  Glu  Ala  Val  Ala  Val  Ala

```



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<210> 9
<211> 246
<212> PRT
<213> Thermotoga maritima
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| | | | | | | | | | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| <400> 9 | | | | | | | | | | | | | | | | |
| Met | Tyr | Leu | Leu | Val | Asp | Val | Gly | Asn | Thr | His | Ser | Val | Phe | Ser | Ile | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Thr | Glu | Asp | Gly | Lys | Thr | Phe | Arg | Arg | Trp | Arg | Leu | Ser | Thr | Gly | Val | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Phe | Gln | Thr | Glu | Asp | Glu | Leu | Phe | Ser | His | Leu | His | Pro | Leu | Leu | Gly | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Asp | Ala | Met | Arg | Glu | Ile | Lys | Gly | Ile | Gly | Val | Ala | Ser | Val | Val | Pro | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Thr | Gln | Asn | Thr | Val | Ile | Glu | Arg | Phe | Ser | Gln | Lys | Tyr | Phe | His | Ile | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Ser | Pro | Ile | Trp | Val | Lys | Ala | Lys | Asn | Gly | Cys | Val | Lys | Trp | Asn | Val | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Lys | Asn | Pro | Ser | Glu | Val | Gly | Ala | Asp | Arg | Val | Ala | Asn | Val | Val | Ala | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Phe | Val | Lys | Glu | Tyr | Gly | Lys | Asn | Gly | Ile | Ile | Ile | Asp | Met | Gly | Thr | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Ala | Thr | Thr | Val | Asp | Leu | Val | Val | Asn | Gly | Ser | Tyr | Glu | Gly | Gly | Ala | |
| | | | | | | 135 | | | | | 140 | | | | | |
| Ile | Leu | Pro | Gly | Phe | Phe | Met | Met | Val | His | Ser | Leu | Phe | Arg | Gly | Thr | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Ala | Lys | Leu | Pro | Leu | Val | Glu | Val | Lys | Pro | Ala | Asp | Phe | Val | Val | Gly | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Lys | Asp | Thr | Glu | Glu | Asn | Ile | Arg | Leu | Gly | Val | Val | Asn | Gly | Ser | Val | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Tyr | Ala | Leu | Glu | Gly | Ile | Ile | Gly | Arg | Ile | Lys | Glu | Val | Tyr | Gly | Asp | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Leu | Pro | Val | Val | Leu | Thr | Gly | Gly | Gln | Ser | Lys | Ile | Val | Lys | Asp | Met | |
| | | | | | | 215 | | | | | 220 | | | | | |
| Ile | Lys | His | Glu | Ile | Phe | Asp | Glu | Asp | Leu | Thr | Ile | Lys | Gly | Val | Tyr | |

225 230 235 240

His Phe Cys Phe Gly Asp
 245

<210> 10
<211> 273
<212> PRT
<213> Treponema pallidum

<400> 10

Met Leu Leu Ile Asp Val Gly Asn Ser His Val Val Phe Gly Ile Gln
 1 5 10 15

Gly Glu Asn Gly Gly Arg Val Cys Val Arg Glu Leu Phe Arg Leu Ala
 20 25 30

Pro Asp Ala Arg Lys Thr Gln Asp Glu Tyr Ser Leu Leu Ile His Ala
 35 40 45

Leu Cys Glu Arg Ala Gly Val Gly Arg Ala Ser Leu Arg Asp Ala Phe
 50 55 60

Ile Ser Ser Val Val Pro Val Leu Thr Lys Thr Ile Ala Asp Ala Val
 65 70 75 80

Ala Gln Ile Ser Gly Val Gln Pro Val Val Phe Gly Pro Trp Ala Tyr
 85 90 95

Glu His Leu Pro Val Arg Ile Pro Glu Pro Val Arg Ala Glu Ile Gly
 100 105 110

Thr Asp Leu Val Ala Asn Ala Val Ala Ala Tyr Val His Phe Arg Ser
 115 120 125

Ala Cys Val Val Val Asp Cys Gly Thr Ala Leu Thr Phe Thr Ala Val
 130 135 140

Asp Gly Thr Gly Leu Ile Gln Gly Val Ala Ile Ala Pro Gly Leu Arg
 145 150 155 160

Thr Ala Val Gln Ser Leu His Thr Gly Thr Ala Gln Leu Pro Leu Val
 165 170 175

Pro Leu Ala Leu Pro Asp Ser Val Leu Gly Lys Asp Thr Thr His Ala
 180 185 190

Val Gln Ala Gly Val Val Arg Gly Thr Leu Phe Val Ile Arg Ala Met
 195 200 205

Ile Ala Gln Cys Gln Lys Glu Leu Gly Cys Arg Cys Ala Ala Val Ile
 210 215 220

Thr Gly Gly Leu Ser Arg Leu Phe Ser Ser Glu Val Asp Phe Pro Pro
 225 230 235 240

Ile Asp Ala Gln Leu Thr Leu Ser Gly Leu Ala His Ile Ala Arg Leu
 245 250 255

Val Pro Thr Ser Leu Leu Pro Pro Ala Thr Val Ser Gly Ser Ser Gly

270

[illegible]

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<210> 12
<211> 229
<212> PRT
<213> Aquifex aeolicus
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<210> 13
<211> 257
<212> PRT
<213> Synechocystis sp.
<400> 13
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Met Glu Thr Ser Lys Pro Gly Cys Gly Leu Ala Leu Asp Asn Asp Lys
 1 5 10 15
 Gln Lys Pro Trp Leu Gly Leu Met Ile Gly Asn Ser Arg Leu His Trp
 20 25 30
 Ala Tyr Cys Ser Gly Asn Ala Pro Leu Gln Thr Trp Val Thr Asp Tyr
 35 40 45
 Asn Pro Lys Ser Ala Gln Leu Pro Val Leu Leu Gly Lys Val Pro Leu
 50 55 60
 Met Leu Ala Ser Val Val Pro Glu Gln Thr Glu Val Trp Arg Val Tyr
 65 70 75 80
 Gln Pro Lys Ile Leu Thr Leu Lys Asn Leu Pro Leu Val Asn Leu Tyr
 85 90 95
 Pro Ser Phe Gly Ile Asp Arg Ala Leu Ala Gly Leu Gly Thr Gly Leu
 100 105 110
 Thr Tyr Gly Phe Pro Cys Leu Val Val Asp Gly Gly Thr Ala Leu Thr
 115 120 125
 Ile Thr Gly Phe Asp Gln Asp Lys Lys Leu Val Gly Gly Ala Ile Leu
 130 135 140
 Pro Gly Leu Gly Leu Gln Leu Ala Thr Leu Gly Asp Arg Leu Ala Ala
 145 150 155 160
 Leu Pro Lys Leu Glu Met Asp Gln Leu Thr Glu Leu Pro Asp Arg Trp
 165 170 175
 Ala Leu Asp Thr Pro Ser Ala Ile Phe Ser Gly Val Val Tyr Gly Val
 180 185 190
 Leu Gly Ala Leu Gln Ser Tyr Leu Gln Asp Trp Gln Lys Leu Phe Pro
 195 200 205
 Gly Ala Ala Met Val Ile Thr Gly Gly Asp Gly Lys Ile Leu His Gly
 210 215 220
 Phe Leu Lys Glu His Ser Pro Asn Leu Ser Val Ala Trp Asp Asp Asn
 225 230 235 240
 Leu Ile Phe Leu Gly Met Ala Ala Ile His His Gly Asp Arg Pro Ile
 245 250 255

Cys

<210> 14

<211> 223

<212> PRT

<213> Helicobacter pylori

<400> 14

Met Pro Ala Arg Gln Ser Phe Thr Asp Leu Lys Asn Leu Val Leu Cys
 1 5 10 15

Asp Ile Gly Asn Thr Arg Ile His Phe Ala Gln Asn Tyr Gln Leu Phe
 20 25 30
 Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile
 35 40 45
 Phe Tyr Ile Ser Val Asn Glu Glu Asn Glu Lys Ala Leu Leu Asn Cys
 50 55 60
 Tyr-Pro Asn Ala Lys Asn Ile Ala Gly Phe Phe His Leu Glu Thr Asp
 65 70 75 80
 Tyr Val Gly Leu Gly Ile Asp Arg Gln Met Ala Cys Leu Ala Val Asn
 85 90 95
 Asn Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile Asp Leu Ile
 100 105 110
 Lys Glu Gly Lys His Leu Gly Gly Cys Ile Leu Pro Gly Leu Ala Gln
 115 120 125
 Tyr Ile His Ala Tyr Lys Lys Ser Ala Lys Ile Leu Glu Gln Pro Phe
 130 135 140
 Lys Ala Leu Asp Ser Leu Glu Val Leu Pro Lys Ser Thr Arg Asp Ala
 145 150 155 160
 Val Asn Tyr Gly Met Val Leu Ser Val Ile Ala Cys Ile Gln His Leu
 165 170 175
 Ala Lys Asn Gln Lys Ile Tyr Leu Cys Gly Gly Asp Ala Lys Tyr Leu
 180 185 190
 Ser Ala Phe Leu Pro His Ser Val Cys Lys Glu Arg Leu Val Phe Asp
 195 200 205
 Gly Met Glu Ile Ala Leu Lys Lys Ala Gly Ile Leu Glu Cys Lys
 210 215 220

<210> 15

<211> 267

<212> PRT

<213> Bordetella pertussis

<400> 15

Met Ile Ile Leu Ile Asp Ser Gly Asn Ser Arg Leu Lys Val Gly Trp
 1 5 10 15
 Phe Asp Pro Asp Ala Pro Gln Ala Ala Arg Glu Pro Ala Pro Val Ala
 20 25 30
 Phe Asp Asn Leu Asp Leu Asp Ala Leu Gly Arg Trp Leu Ala Thr Leu
 35 40 45
 Pro Arg Arg Pro Gln Arg Ala Leu Gly Val Asn Val Ala Gly Leu Ala
 50 55 60
 Arg Gly Glu Ala Ile Ala Ala Thr Leu Arg Ala Gly Gly Cys Asp Ile
 65 70 75 80

Arg Trp Leu Arg Ala Gln Pro Leu Ala Met Gly Leu Arg Asn Gly Tyr
 85 90 95
 Arg Asn Pro Asp Gln Leu Gly Ala Asp Arg Trp Ala Cys Met Val Gly
 100 105 110
 Val Leu Ala Arg Gln Pro Ser Val His Pro Pro Leu Leu Val Ala Ser
 115 120 125
 Phe Gly Thr Ala Thr Thr Leu Asp Thr Ile Gly Pro Asp Asn Val Phe
 130 135 140
 Pro Gly Gly Leu Ile Leu Pro Gly Pro Ala Met Met Arg Gly Ala Leu
 145 150 155 160
 Ala Tyr Gly Thr Ala His Leu Pro Leu Ala Asp Gly Leu Val Ala Asp
 165 170 175
 Tyr Pro Ile Asp Thr His Gln Ala Ile Ala Ser Gly Ile Ala Ala Ala
 180 185 190
 Gln Ala Gly Ala Ile Val Arg Gln Trp Leu Ala Gly Arg Gln Arg Tyr
 195 200 205
 Gly Gln Ala Pro Glu Ile Tyr Val Ala Gly Gly Gly Trp Pro Glu Val
 210 215 220
 Arg Gln Glu Ala Glu Arg Leu Leu Ala Val Thr Gly Ala Ala Phe Gly
 225 230 235 240
 Ala Thr Pro Gln Pro Thr Tyr Leu Asp Ser Pro Val Leu Asp Gly Leu
 245 250 255
 Ala Ala Leu Ala Ala Gln Gly Ala Pro Thr Ala
 260 265

<210> 16
 <211> 702
 <212> DNA
 <213> Bacillus subtilis

<220>
 <221> CDS
 <222> (1)..(699)

<400> 16
 ttg tta ctg gtt atc gat gtg ggg aac acc aat act gta ctt ggt gta 48
 Met Leu Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val
 1 5 10 15
 tat cat gat gga aaa tta gaa tat cac tgg cgt ata gaa aca agc agg 96
 Tyr His Asp Gly Lys Leu Glu Tyr His Trp Arg Ile Glu Thr Ser Arg
 20 25 30
 cat aaa aca gaa gat gag ttt ggg atg att ttg cgc tcc tta ttt gat 144
 His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp
 35 40 45
 cac tcc ggg ctt atg ttt gaa cag ata gat ggc att att att tcg tca 192
 His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser

| 50 | 55 | 60 | |
|---|-----|-----|-----|
| gta gtg ccg cca atc atg ttt gcg tta gaa aga atg tgc aca aaa tac | | | 240 |
| Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr | | | |
| 65 | 70 | 75 | 80 |
| ttt cat atc gag cct caa att gtt ggt cca ggt atg aaa acc ggt tta | | | 288 |
| Phe His Ile Glu Pro Gln Ile Val Gly Gly Met Lys Thr Gly Leu | | | |
| | 85 | 90 | 95 |
| aat ata aaa tat gac aat ccg aaa gaa gta ggg gca gac aga atc gta | | | 336 |
| Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val | | | |
| | 100 | 105 | 110 |
| aat gct gtc gct gcg ata cac ttg tac ggc aat cca tta att gtt gtc | | | 384 |
| Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val | | | |
| | 115 | 120 | 125 |
| gat ttc gga acc gcc aca acg tac tgc tat att gat gaa aac aaa caa | | | 432 |
| Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln | | | |
| | 130 | 135 | 140 |
| tac atg ggc ggg gcg att gcc cct ggg att aca att tcg aca gag gcg | | | 480 |
| Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala | | | |
| | 145 | 150 | 155 |
| ctt tac tcg cgt gca gca aag ctt cct cgt atc gaa atc acc cgg ccc | | | 528 |
| Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro | | | |
| | 165 | 170 | 175 |
| gac aat att atc gga aaa aac act gtt agc gcg atg caa tct gga att | | | 576 |
| Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile | | | |
| | 180 | 185 | 190 |
| tta ttt ggc tat gtc ggc caa gtg gaa gga atc gtt aag cga atg aaa | | | 624 |
| Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys | | | |
| | 195 | 200 | 205 |
| tgg cag gca aaa cag gac cca agg tca ttg cga cag gag gcc tgg cgc | | | 672 |
| Trp Gln Ala Lys Gln Asp Pro Arg Ser Leu Arg Gln Glu Ala Trp Arg | | | |
| | 210 | 215 | 220 |
| cgc tca ttg cga acg aat cag att gta tag | | | 702 |
| Arg Ser Leu Arg Thr Asn Gln Ile Val | | | |
| | 225 | 230 | |

<210> 17

<211> 233

<212> PRT

<213> Bacillus subtilis

<400> 17

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Leu | Leu | Val | Ile | Asp | Val | Gly | Asn | Thr | Asn | Thr | Val | Leu | Gly | Val |
| 1 | | | | 5 | | | | 10 | | | | | 15 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | His | Asp | Gly | Lys | Leu | Glu | Tyr | His | Trp | Arg | Ile | Glu | Thr | Ser | Arg |
| | 20 | | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Lys | Thr | Glu | Asp | Glu | Phe | Gly | Met | Ile | Leu | Arg | Ser | Leu | Phe | Asp |
| | 35 | | | | | | 40 | | | | | 45 | | | |

His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser
 50 55 60
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr
 65 70 75 80
 Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu
 85 90 95
 Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val
 100 105 110
 Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val
 115 120 125
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln
 130 135 140
 Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala
 145 150 155 160
 Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro
 165 170 175
 Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile
 180 185 190
 Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys
 195 200 205
 Trp Gln Ala Lys Gln Asp Pro Arg Ser Leu Arg Gln Glu Ala Trp Arg
 210 215 220
 Arg Ser Leu Arg Thr Asn Gln Ile Val
 225 230

<210> 18
 <211> 163
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:promoter
 sequence

<220>
 <221> -35_signal
 <222> (113)..(118)

<220>
 <221> -10_signal
 <222> (136)..(141)

<400> 18
 gcctacctag cttccaagaa agatataccta acagcacaag agcggaaaga tgttttgttc 60
 tacatccaga acaacctctg ctaaaattcc tgaaaaattt tgcaaaaagt tgttgacttt 120
 atctacaagg tgtggtataa taatcttaac aacagcagga cgc 163

| | | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| <400> 20 | | | | | | | | | | | | | | | | |
| Met | Ile | Leu | Glu | Leu | Asp | Cys | Gly | Asn | Ser | Leu | Ile | Lys | Trp | Arg | Val | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Ile | Glu | Gly | Ala | Ala | Arg | Ser | Val | Ala | Gly | Gly | Leu | Ala | Glu | Ser | Asp | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Asp | Ala | Leu | Val | Glu | Gln | Leu | Thr | Ser | Gln | Gln | Ala | Leu | Pro | Val | Arg | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Ala | Cys | Arg | Leu | Val | Ser | Val | Arg | Ser | Glu | Gln | Glu | Thr | Ser | Gln | Leu | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Val | Ala | Arg | Leu | Glu | Gln | Leu | Phe | Pro | Val | Ser | Ala | Leu | Val | Ala | Ser | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Ser | Gly | Lys | Gln | Leu | Ala | Gly | Val | Arg | Asn | Gly | Tyr | Leu | Asp | Tyr | Gln | |
| | | | 85 | | | | | | 90 | | | | | 95 | | |
| Arg | Leu | Gly | Leu | Asp | Arg | Trp | Leu | Ala | Leu | Val | Ala | Ala | His | His | Leu | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Ala | Lys | Lys | Ala | Cys | Leu | Val | Ile | Asp | Leu | Gly | Thr | Ala | Val | Thr | Ser | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Asp | Leu | Val | Ala | Ala | Asp | Gly | Val | His | Leu | Gly | Gly | Tyr | Ile | Cys | Pro | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |

Gly Met Thr Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg Ile
 145 150 155 160
 Arg Tyr Asp Asp Ala Glu Ala Arg Arg Ala Leu Ala Ser Leu Gln Pro
 165 170 175
 Gly Gln Ala Thr Ala Glu Ala Val Glu Arg Gly Cys Leu Leu Met Leu
 180 185 190
 Arg Gly Phe Val Arg Glu Gln Tyr Ala Met Ala Cys Glu Leu Leu Gly
 195 200 205
 Pro Asp Cys Glu Ile Phe Leu Thr Gly Gly Asp Ala Glu Leu Val Arg
 210 215 220
 Asp Glu Leu Ala Gly Ala Arg Ile Met Pro Asp Leu Val Phe Val Gly
 225 230 235 240
 Leu Ala Leu Ala Cys Pro Ile Glu
 245

<210> 21
 <211> 209
 <212> PRT
 <213> Campylobacter jejuni

<400> 21
 Met Leu Leu Cys Asp Ile Gly Asn Ser Asn Ala Asn Phe Leu Asp Asp
 1 5 10 15
 Asn Lys Tyr Phe Thr Leu Asn Ile Asp Gln Phe Leu Glu Phe Lys Asn
 20 25 30
 Glu Gln Lys Ile Phe Tyr Ile Asn Val Asn Glu His Leu Lys Glu His
 35 40 45
 Leu Lys Asn Gln Lys Asn Phe Ile Asn Leu Glu Pro Tyr Phe Leu Phe
 50 55 60
 Asp Thr Ile Tyr Gln Gly Leu Gly Ile Asp Arg Ile Ala Ala Cys Tyr
 65 70 75 80
 Thr Ile Glu Asp Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile
 85 90 95
 Asp Ile Ile Ser Asn Ser Ile His Leu Gly Gly Phe Ile Leu Pro Gly
 100 105 110
 Ile Ala Asn Tyr Lys Lys Ile Tyr Ser His Ile Ser Pro Arg Leu Lys
 115 120 125
 Ser Glu Phe Asn Thr Gln Val Ser Leu Asp Ala Phe Pro Gln Lys Thr
 130 135 140
 Met Asp Ala Leu Ser Tyr Gly Val Phe Lys Gly Ile Tyr Leu Leu Ile
 145 150 155 160
 Lys Asp Ala Ala Gln Asn Lys Lys Leu Tyr Phe Thr Gly Gly Asp Gly
 165 170 175

| | | | | | | | | | | | | | | | | |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|----|
| <400> 22 | | | | | | | | | | | | | | | | |
| Met 1 | Thr | Val | Leu | Lys 5 | Pro | Ser | His | Trp | Arg 10 | Val | Leu | Ala | Glu | Leu 15 | Ala | |
| Asp | Gly | Leu | Pro 20 | Gln | His | Val | Ser | Gln 25 | Leu | Ala | Arg | Met | Ala 30 | Asp | Met | |
| Lys | Pro | Gln 35 | Gln | Leu | Asn | Gly | Phe 40 | Trp | Gln | Gln | Met | Pro 45 | Ala | His | Ile | |
| Arg | Gly 50 | Leu | Leu | Arg | Gln | His 55 | Asp | Gly | Tyr | Trp | Arg 60 | Leu | Val | Arg | Pro | |
| Leu 65 | Ala | Val | Phe | Asp | Ala 70 | Glu | Gly | Leu | Arg | Glu 75 | Leu | Gly | Glu | Arg | Ser | 80 |
| Gly | Phe | Gln | Thr | Ala 85 | Leu | Lys | His | Glu | Cys 90 | Ala | Ser | Ser | Asn | Asp 95 | Glu | |
| Ile | Leu | Glu | Leu 100 | Ala | Arg | Ile | Ala | Pro 105 | Asp | Lys | Ala | His | Lys 110 | Thr | Ile | |
| Cys | Val | Thr 115 | His | Leu | Gln | Ser | Lys 120 | Gly | Arg | Gly | Arg | Gln 125 | Gly | Arg | Lys | |
| Trp | Ser 130 | His | Arg | Leu | Gly | Glu 135 | Cys | Leu | Met | Phe | Ser 140 | Phe | Gly | Trp | Val | |
| Phe 145 | Asp | Arg | Pro | Gln | Tyr 150 | Glu | Leu | Gly | Ser | Leu 155 | Ser | Pro | Val | Ala | Ala 160 | |
| Val | Ala | Cys | Arg | Arg 165 | Ala | Leu | Ser | Arg | Leu | Gly | Leu | Lys | Thr | Gln 175 | Ile | |
| Lys | Trp | Pro | Asn 180 | Asp | Leu | Val | Val | Gly 185 | Arg | Asp | Lys | Leu | Gly 190 | Gly | Ile | |
| Leu | Ile | Glu 195 | Thr | Val | Arg | Thr | Gly 200 | Gly | Lys | Thr | Val | Ala 205 | Val | Val | Gly | |
| Ile | Gly 210 | Ile | Asn | Phe | Val | Leu 215 | Pro | Lys | Glu | Val | Glu 220 | Asn | Ala | Ala | Ser | |
| Val 225 | Gln | Ser | Leu | Phe | Gln 230 | Thr | Ala | Ser | Arg | Arg 235 | Gly | Asn | Ala | Asp | Ala 240 | |

Ala Val Leu Leu Glu Thr Leu Leu Ala Glu Leu Asp Ala Val Leu Leu
 245 250 255
 Gln Tyr Ala Arg Asp Gly Phe Ala Pro Phe Val Ala Glu Tyr Gln Ala
 260 265 270
 Ala Asn Arg Asp His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu
 275 280 285
 Thr Val Phe Glu Gly Thr Val Lys Gly Val Asp Gly Gln Gly Val Leu
 290 295 300
 His Leu Glu Thr Ala Glu Gly Lys Gln Thr Val Val Ser Gly Glu Ile
 305 310 315 320
 Ser Leu Arg Ser Asp Asp Arg Pro Val Ser Val Pro Lys Arg Arg Asp
 325 330 335
 Ser Glu Arg Phe Leu Leu Leu Asp Gly Gly Asn Ser Arg Leu Lys Trp
 340 345 350
 Ala Trp Val Glu Asn Gly Thr Phe Ala Thr Val Gly Ser Ala Pro Tyr
 355 360 365
 Arg Asp Leu Ser Pro Leu Gly Ala Glu Trp Ala Glu Lys Val Asp Gly
 370 375 380
 Asn Val Arg Ile Val Gly Cys Ala Val Cys Gly Glu Phe Lys Lys Ala
 385 390 395 400
 Gln Val Gln Glu Gln Leu Ala Arg Lys Ile Glu Trp Leu Pro Ser Ser
 405 410 415
 Ala Gln Ala Leu Gly Ile Arg Asn His Tyr Arg His Pro Glu Glu His
 420 425 430
 Gly Ser Asp Arg Trp Phe Asn Ala Leu Gly Ser Arg Arg Phe Ser Arg
 435 440 445
 Asn Ala Cys Val Val Val Ser Cys Gly Thr Ala Val Thr Val Asp Ala
 450 455 460
 Leu Thr Asp Asp Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe
 465 470 475 480
 His Leu Met Lys Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg
 485 490 495
 His Ala Gly Lys Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val
 500 505 510
 Ala Ser Gly Met Met Asp Ala Val Cys Gly Ser Val Met Met Met His
 515 520 525
 Gly Arg Leu Lys Glu Lys Thr Gly Ala Gly Lys Pro Val Asp Val Ile
 530 535 540
 Ile Thr Gly Gly Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala
 545 550 555 560

Phe Leu Ala Glu Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile His
565 570 575

Gly Leu Leu Asn Leu Ile Ala Ala Glu Gly Gly Glu Ser Glu His Thr
580 585 590

<210> 23
<211> 753
<212> DNA
<213> *Clostridium acetobutylicum*

<400> 23
aataagagag cagcttttat gctgctctta tttttaagga gtgtattaaa agtgatttta 60
gttttagatg ttggcaatac taatatagtg ttaggaatat acaatgatac gaaacttaca 120
gctgaatgga gactatcaac agatgtatta agatctgctg acgaatatgg aattcaagta 180
atgaacttat ttcaacaaga taagctcgat ccaacattag ttgagggagt aataatatcc 240
tctgttgtag ctaatatcat gtattcttta gaacatatga taagaaagta ctttaagata 300
aatccattag ttgttgagacc tgggaataaaa acaggaatta atattaaata cgataatcct 360
aaagaagttg gagccgacag aattgtaaat gctgtagcag cacatgaaat ttataaaaaga 420
tctcttataa taatagattt tggacagca actacatttt gtgcagtaag agaaaatgga 480
gattatcttg gtggagcaat atgccctgga attaaagttt catcagaggc tctttttgaa 540
aaggcagcta agcttccaag agtagagctc ataaaaccag cgtatgctat ttgtaaaaat 600
actatttcaa gtatacaatc tgggaattgtt tatcgatacc tacgtcaggt aaaatactta 660
tttgaaaaat tgaaagaaaa cctgccggac ggaaggagaa caaggacctc cttggtattg 720
gccacaggtg gtcttgccaa acttattaat tga 753

<210> 24
<211> 798
<212> DNA
<213> *Streptomyces coelicolor*

<400> 24
atgctgctga cgatcgacgt agggaaacacg cacaccgtcc tcggcctctt cgacggcgag 60
gacatcgteg agcactggcg catctccacg gactcgcgcc gcacggccga cgaactggcg 120
gtgctcctcc agggcctcat gggcatgcat cccctcctcg gcgacgaact gggcgacggc 180
atcgacggca tcgccatctg cgcgacggtc cctcctcgcc tcacgaact gcgagggc 240
acccgcgct actacggcga cgtccccgcg gtctcctcg aaccggcggt caagaccggc 300
gtcccgatcc tcaccgacca cccaaggag gtccggcgcc accgcatcat caacgcggta 360
gcgccgctgg agctctacgg cgcccggcg atcgctgctg acttcggcac ggcgacgacg 420
ttcgacggcg tcagcgcgcg cggggagtag atcgggcgcg tcacgcccc cgcatcgag 480
atctcggtcg aggcgctggg cgtcaagggc gccagctcc gcaagatcga ggtggcgcg 540
ccccgcagcg tgatcggaag gaacacggtc gaggcgatgc agtccggcat cgtgtacggc 600
ttcgccggcc aggtcgacgg cgtcgtcaac cgtggtggcg gggagctggc cgacgacccg 660
gacgacgtga cggtcacgac gacggcggg ctggcgccga tggctcctgg cgagtcctcg 720
gtcatcgacg agcacgagcc gtgggtgacg ctgatgggtc tgcgcctggt gtacgagcgc 780
aacgtgtcgc gcatgtag 798

<210> 25
<211> 819
<212> DNA
<213> *Mycobacterium tuberculosis*

<400> 25
gtgctgctgg cgattgacgt ccgcaacacc cacaccgttg tgggcctgct gtccggaatg 60
aaagagcacg caaaggctcg gcagcagtg cggatacgca ccgaatccga agtcaccgcc 120
gacgaactgg cactgacgat cgacgggctg atcggcgagg attccgagcg gctcaccggc 180
accgccgcct tgtccacggc cccgtccgtg ctgcacgagg tgcggataat gctcgaccag 240
tactggccgt cggtgccgca cgtgctgac gagccggag tacgcaccgg gatccctttg 300
ctcgtcgaca acccgaagga agtgggcgca gaccgcatcg tgaactgttt ggccgcctat 360
gaccggttcc ggaaggccgc catcgtcgtt gactttggat cctcgatctg tgttgatggt 420

```

gtatcgcca aggggtgaatt tcttgccgc gccatcgcg ccgggggtgca ggtgtcttcc 480
gatgccgcg cggcccgctc ggccgcattg cgccgcgttg aacttgccc cccacgttcg 540
gtgggttgca agaaccacgt cgaatgcatg caagccggtg cgggtgttcg cttcgccggg 600
ctggttagac gggtggttag ccgcatccgc gaggacgtgt ccggtttctc cgtcgaccac 660
gatgtcgcga tcgtggctac cgggcatacc gcgcccctgc tgcgtccgga attgcacacc 720
gtcgaccatt acgaccagca cctgacctg cagggctctg ggctggtgtt cgagcgtaac 780
ctcgaagtcc agcgcgggccg gctcaagacg gcgcgctga 819

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<210> 26

<211> 777

<212> DNA

<213> Rhodobacter capsulatus

<400> 26

```

atgcttttgt gcatcgactg cggcaacacc aacaccgtgt ttccggtctg ggacgggacg 60
gatttcgccc ccacctggcg catcgccacc gatcatcgcc gcaccgcca cgaatatttc 120
gtctggctga acacgctgat gcaactgaag ggcctgcagg gccggatctc cgaggcgatc 180
atctcctcga ccgcgcccgc ggtggtgttc aacctgcgcg ttctgtgcaa ccgctatttc 240
gactgccgcc cctatgtcgt cggcaaaccg ggctgcgagc tgccggtggc gccgcgcgtc 300
gatccgggca ccacggtcgg gccggaccgg ctggtcaata cgggtggcgg ctatgaccgt 360
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cccgatggcg cctatatcgg cggggtgate gcgcccgggg tgaacctgag ccttgaggcg 480
ctgcatatgg cggcgccgcg gctgccgcgt gtcgacgtca cgaaaccgca aggggtgatc 540
ggcacgaata cgggtggcctg catccaatcc ggggtgtatt ggggctatat cggccttgtc 600
gaaggcatcg tgcggcagat ccggatggaa cgtgaccgtc cgatgaagg gattgccacc 660
gggggtcttg cctcgctctt cgatctgggt ttcgatctgt tcgacaagg cgaggatgac 720
ctgacctgac atggtctgcy tctgatcttc gattacaaca agggacttgg ggcgtga 777

```

<210> 27

<211> 768

<212> DNA

<213> Geobacter sulfurreducens

<400> 27

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gtgcttcttg ttatagacgt gggtaatacc aatatcgtgc tcgggattta cgatggcgag 60
cgcttggtga gggattggcg ggtctccacg gacaaggccc gtactaccga cgagtacggt 120
attctcataa atgagttggt ccgcttggcg ggccttgggc tcgatcagat ccgcgcggtg 180
atcatctcct cgggtggtgcc gccctcacc ggcgtgctgg agcgtctttc cctggggtat 240
ttcgggatgc gtcccctggt ggtgggaccg ggcatacaga caggcatgcc aatccagtac 300
gacaaccccc gggagggtgg ggccgaccgg atcgtgaacg cgggtggcgg gtacgagaag 360
taccgcacct ctctcattat cgtcgatttc ggaccgcta ccacgttcga ctacgtgaac 420
cgcaaggagg agtactgcgg aggggccatc gcgcccggac tcgtcatttc caccgaggcc 480
ctgttccagc gggccagcaa gctgcccagg gttgatata tacgtccgtc cgcgatcatt 540
ggcaggaaaca cgtcaattc gatgcaggcg ggaatttact atggttacgt ggggctcgta 600
gacgagatcg tcacccggat gaaggccgag agcaaggatg cgccccgggt tatcgctacc 660
ggagggttgg cgtccctcat agcgccggag tccaagacca tcgaagccgt cgaggaatat 720
ctgacactgg agggattgcy catactgtac gaacgaaaca gggagtga 768

```

<210> 28

<211> 789

<212> DNA

<213> Deinococcus radiodurans

<400> 28

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gtgcccgtt ttcccctgct cgccgtggac atcggaaca ccaccaccgt cctgggtctg 60
gccgacgct cgggcgcctt gacccacacc tgccggtatc ggaccaaccg cgagatgctg 120
cccagcagac tcgcgctgca actgcacggg ctcttttacc tcgccggggc gccgattccc 180
cgcccccggc tgcgtgacag cgtggcgccc ccggtgggcg aaaactacgc gctcgcgctc 240
aagcggaact tcatgatcga cgcttttggc gtgagtgcg agaacctgcc cgacgtgacg 300
gtggaactcg acacgccggg ctccggtgggt gcggaccgcc tgtgcaacct cttcggcgcc 360
gaaaagtacc tgggggggct ggactacgcy gtggtagtgg atttcgggac ctccaccaac 420

```

```

tttgacgtgg tggggcgggg gcggcgtttc ctcggcggca tcctcgccac cggagcgcag 480
gtcagcgccg acgccctggt cgcgcgcgcc gccaaactgc cgcgcacac cctgcaagcg 540
cccgagacgg ccatcggcaa aaacaccgtc cacgcgctgc aatcgggcct ggtcttcggc 600
tacgccgaga tggtaggacgg cctgctgcgc cgcacccgcg ccgagttgcc gggcggaagcg 660
gtcgccgtcg ccaactggcg cttctcgcgc accgtgcagg ggatttgcca ggaaatcgac 720
tactacgacg aaacgctgac gttgcgcggg ttggtggagc tgtgggcgag ccgttcggag 780
gtccgctga

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<210> 29

<211> 741

<212> DNA

<213> *Thermotoga maritima*

<400> 29

```

ttgtacctcc tcgtggacgt gggtaaacacg cattctgtct tctctatcac cgaagatggt 60
aaaactttca gaaggtggag gctgtccacc ggtgtgtttc agacggaaga cgaactcttt 120
tcacaccttc atcctcttct gggcgatgct atgctgaga taaaggggat aggagtggcc 180
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tcaccgatat gggtagaagg gaaaaacgga tgtgtgaaat ggaacgtgaa gaatccctcg 300
gaagtgggtg ctgatagggt ggccaacggt gtcgctttcg tcaaggaata cggtaaaaac 360
ggaatcatca tcgacatggg aacggcaacc accgtggatc ttgttgtaga cggatcttac 420
gaaggaggag ccattttgcc tggattcttc atgatgggtc actcgtctct tcggggaacg 480
gcaaaacttc cgctcggttg ggtaaaaacca gcggattttg ttgtaggaaa ggatacggag 540
gaaaacatca ggctgggtgt ggtgaacgga agtgtctacg ctcttgaggg gataataggg 600
cgaataaagg aagtttacgg tgattttacc gtggttctca cgggaggtca gtcgaagatc 660
gtgaaagata tgataaaaca cgagattttc gatgaggacc tcacgatcaa gggggtgtac 720
catttctgct tcggagattg a

```

<210> 30

<211> 822

<212> DNA

<213> *Treponema pallidum*

<400> 30

```

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gagtactcgc ttctcatcca tgcgctttgc gaacgtgcgg gggtcggccg tgcttctctc 180
cgtgatgcgt ttatttctct cgctcgtgct gtgttgacaa agaccattgc agatgcggtc 240
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gtgcgcatac cagagccagt gcgcgcggaa attggcactg acttggttag caacgcggtg 360
gcggcctatg tgcatttccg ttctgcttgc gtggtagtgg attgtggaac agcgtcacc 420
tttacggcgg tggatggcac ggggttgatt caaggggtgg caattgcgcc tgggtctgcg 480
actgcggtgc agtctctcca tacaggaacg gcacaattac cacttggtcc tcttgccctg 540
cctgattccg ttctgggcaa ggatactacg catcggtgac aggcgggtgt ggtgcggggc 600
acgctctttg ttattcgcgc tatgattgca cagtgtcaga aagagttagg gtgccgctgt 660
gcagcgggtg taacgggggg gctttcgcgt cttttctcgt cagaggtgga ctttctctct 720
atcgatgcac agctgacgct ctcaggtctt gcacatattg cgcggctggt gccgacatct 780
ctcctgccac ctgctacagt gtcaggttca tcggggaatt ga

```

<210> 31

<211> 789

<212> DNA

<213> *Borrelia burgdorferi*

<400> 31

```

atgaataaac ctttattatc agaattgata attgatattg gaaataaccag cattgctttt 60
gccttattta aagataatca agttaattta tttattaaaa tgaaaacaaa tcttatgtta 120
aggatgatag aggtttatag cttttttgaa gaaaattttg attttaatgt aaataaagtt 180
tttataagca gcgttggtcc tattcttaat gaaacattta aaaatgtcat tttttctttt 240
tttaagataa agcctttgtt tattgggttt gatttgaatt atgatttgac atttaatcct 300

```



```

tacaaaagcg ataaatTTTT gctaggttca gacgtttttg ccaatcttgt tgcagccatt 360
gaaaattatt catttgaaaa tgttttagta gtagacctg gaactgcttg caccattttt 420
gctgttagca ggcaagatgg aatactcggg ggtattataa attctgggcc tttgataaat 480
tttaattctt tattagataa tgcctatctt atcaaaaaat tccccattag cactccaaat 540
aatcttttag agagaacgac atctgggagt gtaaacagcg gtttatttta tcaatataag 600
tatttaatat aaggtgttta tctgtgatatt aagcagatgt ataaaaaaaa atttaattta 660
ataattactg ggggtaatgc ggacctaat ttgtcattaa ttgagataga gtttattttt 720
aatattcatt taactgtaga aggcgttaga attttaggaa attctattga ctttaagttt 780
gttaattga

```

<210> 32

<211> 690

<212> DNA

<213> Aquifex aeolicus

<400> 32

```

atgaggTTTT tgacggtaga cgtagggaat tcctccgttg atatcgccct atgggaaggg 60
aagaaagtaa aagattttct gaaactttca cacgaagaat ttttaaagga agaatttcct 120
aaattaaaag cgctcggaat atccgtaaaa cagagtttta gcgaaaaagt aaggggaaaa 180
ataccgaaga taaagtTTTT aaagaaggaa aactttccta tacaggttga ttacaaaact 240
cctgaaacgc tgggcacgga cagggttagca cttgcttact ccgcaaaaaa gttttacgga 300
aagaatgttg tagtaatcag tgcgggtact gcccttgtaa ttgacctagt tcttgagggc 360
aaatttaagg gagggtttat taccttagga cttggaaaga agttaaaaaat tctttccgac 420
ctggcggagg gaattcccgga gttttttccc gaagaggtag aaatttttct tgggcgttct 480
acacgagagt gcgtcctggg aggggcttac agggagagca cagaatttat taaaagtaca 540
ctgaaactct ggagaaaagt atttaaaaga aagttcaaag tgggtataac gggcggagag 600
gggaagtact ttccaagtt cggtattttac gaccactcc ttgttcacag gggcatgaga 660
aatttacttt acctctatca caggatttaa

```

<210> 33

<211> 774

<212> DNA

<213> Synechocystis sp.

<400> 33

```

gtggaacat caaagccggg ttgtggttta gccctggata atgacaagca aaaaccttgg 60
ttaggcctaa tgataggcaa ctcccgtctg cactgggcat attgtagcgg caatgctccc 120
ctgcaaacct gggttacaga ttacaacccc aagtcagctc agttgccggg tttgttgggg 180
aaagtccctc tgatgttggc atcgggtggt cgggaacaaa ccgaagtttg gcgagtatat 240
cagcctaaaa ttttgaccct gaagaatctt cccctggtea atctttaccc cagctttggc 300
attgaccggg ccctggctgg tttagggacg gggctgacct acggctttcc ctgtctagt 360
gttgatggag gcaactgctt gaccattaca gggtttgacc aagataaaaa actggtgggg 420
ggagcgatct tgcccgtttt gggattgcag tttagcaacc ttggcgatcg cctggcgccc 480
ctaccgaagt tagaaatgga tcaattaacc gagttgcttg accgttgggc tttagatacc 540
cccagcgcca ttttttagtg tgttgtctat ggcgtgttgg gggcattgca gagttatctc 600
caggattggc aaaagctttt tcctggtgcc gccatggtta tcaccggggg agacggcaag 660
atattacatg gcttcctaaa agagcattct cctaattctt cggtggcctg ggatgacaat 720
ttgatcttcc tcgggtatggc ggccatacac cacggcgatc gccccatctg ttag 774

```

<210> 34

<211> 672

<212> DNA

<213> Helicobacter pylori

<400> 34

```

atgccagcta ggcaatcttt caaggattta aaagacttga ttttatgcga tataggcaac 60
acacgcatcc atttcgcgca aaactaccag ctcttttcaa gcgctaaaga agatttaaag 120
cgtttgggta ttcaaaaagga aattttttac attagtgtga atgaagaaaa tgaaaaagct 180
cttttaaatt gttaccctaa cgctaaaaat atcgcagggt ttttccattt agaaaccgac 240
tatatagggc ttgggataga ccggcaaatg gcatgtttag cggtgggttaa tgggggttata 300

```

```

gtggatgctg ggagcgcgat tacgattgat ttagtcaaag agggcaagca tttaggaggg 360
tgtatatttc cgggttttag ccaatatgtc catgcgtata aaaaaagcgc gaaaatctta 420
gagcaacctt tcaaagcctt agattcttta gaagttttac caaaaaacac cagagacgct 480
gtgaattacg gcatgatttt gagtatcatc tcttgatcc aacattttagc taaagatcaa 540
aaaatctatc tttgtggggg cgatgcgaaa tatttgagcg cgtttttacc tcattctgtt 600
tgcaaggagc gtttggtttt tgacgggatg gaaatcgctc ttaaaaaagc agggatacta 660
gaatgcaaat ga 672

```

<210> 35

<211> 747

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 35

```

atgattcttg agctcgactg tggaaactcg ctgatcaagt ggcggggtcat cgagggggcg 60
gcgcgggtcg tgcgcgggtg ccttgccgag tccgatgatg ccctggtcga acagttaacg 120
tcgcagcaag cgctgccagt gcgagcctgt cgcctggtga gcgttcgcag cgagcaggaa 180
acctcgcaac tggtcgcacg gttggagcag ctgttcccg tttcggcgct ggttgcata 240
tccggcaagc agttggcggg tgtgcgcaac ggctatctcg attaccagcg cctggggctc 300
gaccgctggc tggccctcgt cgcggtcat cacctggcta agaaggcctg cctgggtcatt 360
gatctgggga ccgcggtcac ctctgacctg gtcgcggcg atggagtga tctggggggc 420
tacatatgcc cgggcatgac cctgatgaga agccagttgc gcacccatac ccgacgtatc 480
cgctacgacg atgcagaggc ccggcggggc cttgccagtc tccagccagg gcaggccacg 540
gccgaggcgg ttgagcgggg ttgtctgtc atgctcaggg ggttcgttcg tgagcagtac 600
gccatggcgt gcgagctgct cggtcgggat tgtgaaatat tctgacggg tggggatgcc 660
gaactggttc gcgacgaact ggctggcgcc cggatcatgc cggacctggt tttcgtaggg 720
ctggcactgg cttgcccgat tgagtga 747

```

<210> 36

<211> 630

<212> DNA

<213> *Campylobacter jejuni*

<400> 36

```

atgttgctct gtgatattgg gaattcaaat gctaatttcc tagatgataa caaatatttt 60
actcttaata tagatcagtt tttagaattt aaaaatgaac aaaaaatttt ttatatcaat 120
gtcaatgaac atctcaaaga acatttaaaa aatcaaaaaa attttatcaa tcttgaacct 180
tattttttat ttgatacaat ttatcaagga ttaggaatcg atcgcatagc agcttggtat 240
actattgaag atggagttgt tgtagatgca ggtagtgtca ttacaattga tattatttct 300
aattctatac atcttggtgg ttttatcttg ccaggatttg caaattataa aaaaatttat 360
agccatattt caccacgatt aaaaagtga tttaacactc aagttagtct tgatgcattc 420
ccacaaaaaa ccattgtagc ttttaagttat ggtgttttta aaggaattta cctactgata 480
aaagatgccg ctcaaaaataa aaagctttat ttcactggtg gagatgggca atttttagca 540
aattatttcg atcacgcaat ttatgataaa cttttaatct ttcgaggaat gaaaaagatt 600
ataaaagaaa atcccaattt actttattaa 630

```

<210> 37

<211> 1779

<212> DNA

<213> *Neisseria meningitidis*

<400> 37

```

atgacggttt tgaagccttc gcaactggcg gtgttggcgg agcttgccga cggtttgccg 60
caacacgtct cgcaactggc gcgtatggcg gatatgaagc cgcagcagct caacggtttt 120
tggcagcaga tgccggcgca catacgcggg ctgttgccgc aacacgacgg ctattggcgg 180
ctggtgcgcc cattggcggt tttcgatgcc gaaggtttgc gcgagctggg ggaaaggctc 240
ggttttcaga cggcattgaa gcacgagtgc gcgtccagca acgacgagat actggaattg 300
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ggcagggggc ggcagggggc gaagtggctc caccgtttgg gcgagtgtct gatgttcagt 420
tttggctggg tgtttgaccg gccgcagtat gagttgggtt cgctgtcgcc tgttgccgca 480
gtggcgtgcc ggcgcgcttc gtcgcgtttg ggtttgaaaa cgcaaatcaa gtggccaaac 540

```

```

gatttggctcg tcggacgcga caaattgggc ggcattctga ttgaaacggt caggacgggc 600
ggcaaaacgg ttgccgtggt cggatcggc atcaatttcg tgctgccaa ggaagtggaa 660
aacgccgctt ccgtgcaatc gctgtttcag acggcatcgc ggcggggaaa tgccgatgcc 720
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tttttggcgg aaaataaccg gcgcgtggcg gacaacctcg tcattcacgg gctgctgaac 1740
ctgattgccg ccgaaggcgg ggaatcgga catacttaa 1779

```

<210> 38
 <211> 804
 <212> DNA
 <213> Bordetella pertussis

```

<400> 38
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ctgggceget ggctggccac cctgccagg cgcccgcaac ggcgcgtggg cgtgaacgtc 180
gccgggcttg ccgcgcgcga agccattgcc gccacgctgc gcgcggcgcg ttgcgacatc 240
cgggtggtgc gggcccagcc cctggccatg ggggtgcgca acggctatcg caatcccgcg 300
caactgggcg ccgaccgctg ggcgtgcatg gtggcgctgc tggcgcgcca gccgtccgtg 360
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tggcccgaag tgcggcagga agccgagcgc ctgctggcgg tcaccggcgc cgccttcggc 720
gccacgcgcg agcccactta cctcgacagc cccgtgctcg acggcctggc ggcgctcgcc 780
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```

<210> 39
 <211> 460
 <212> PRT
 <213> Neisseria gonorrhoeae

```

<400> 39
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Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala Leu Ala Cys Arg
      20             25             30
Arg Ala Leu Gly Cys Leu Gly Leu Thr Gln Ile Lys Trp Pro Asn
      35             40             45
Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile Leu Ile Glu Thr

```

| | | | | | | | | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 50 | | | | 55 | | | | 60 | | | | | | | |
| Val 65 | Arg | Ala | Gly | Gly | Lys 70 | Thr | Val | Ala | Val | Val | Gly | Ile | Gly | Ile | Asn 80 |
| Phe | Val | Leu | Pro | Lys 85 | Glu | Val | Glu | Asn | Ala 90 | Ala | Ser | Val | Gln | Ser 95 | Leu |
| Phe | Gln | Thr | Ala 100 | Ser | Arg | Arg | Gly | Asn 105 | Ala | Asp | Ala | Ala | Val 110 | Leu | Leu |
| Glu | Thr | Leu 115 | Leu | Ala | Glu | Leu | Gly 120 | Ala | Val | Leu | Glu | Gln 125 | Tyr | Ala | Glu |
| Glu | Gly 130 | Phe | Ala | Pro | Phe | Leu 135 | Asn | Glu | Tyr | Glu | Thr 140 | Ala | Asn | Arg | Asp |
| His 145 | Gly | Lys | Ala | Val | Leu 150 | Leu | Leu | Arg | Asp | Gly 155 | Glu | Thr | Val | Cys | Glu 160 |
| Gly | Thr | Val | Lys | Gly 165 | Val | Asp | Gly | Arg | Gly 170 | Val | Leu | His | Leu | Glu 175 | Thr |
| Ala | Glu | Gly | Glu 180 | Gln | Thr | Val | Val | Ser 185 | Gly | Glu | Ile | Ser | Leu 190 | Arg | Pro |
| Asp | Asn | Arg 195 | Ser | Val | Ser | Val | Pro 200 | Lys | Arg | Pro | Asp | Ser 205 | Glu | Arg | Phe |
| Leu 210 | Leu | Leu | Glu | Gly | Gly | Asn 215 | Ser | Arg | Leu | Lys | Trp 220 | Ala | Trp | Val | Glu |
| Asn 225 | Gly | Thr | Phe | Ala | Thr 230 | Val | Gly | Ser | Ala | Pro 235 | Tyr | Arg | Asp | Leu | Ser 240 |
| Pro | Leu | Gly | Ala | Glu 245 | Trp | Ala | Glu | Lys | Ala 250 | Asp | Gly | Asn | Val | Arg 255 | Ile |
| Val | Gly | Cys | Ala 260 | Val | Cys | Gly | Glu | Ser 265 | Lys | Lys | Ala | Gln | Val 270 | Lys | Glu |
| Gln | Leu | Ala 275 | Arg | Lys | Ile | Glu | Trp 280 | Leu | Pro | Ser | Ser | Ala 285 | Gln | Ala | Leu |
| Gly 290 | Ile | Arg | Asn | His | Tyr | Arg 295 | His | Pro | Glu | Glu | His 300 | Gly | Ser | Asp | Arg |
| Trp 305 | Phe | Asn | Ala | Leu | Gly 310 | Ser | Arg | Arg | Phe | Ser 315 | Arg | Asn | Ala | Cys | Val 320 |
| Val | Val | Ser | Cys | Gly 325 | Thr | Ala | Val | Thr | Val 330 | Asp | Ala | Leu | Thr | Asp 335 | Asp |
| Gly | His | Tyr | Leu 340 | Gly | Gly | Thr | Ile | Met 345 | Pro | Gly | Phe | His | Leu 350 | Met | Lys |
| Glu | Ser | Leu 355 | Ala | Val | Arg | Thr | Ala 360 | Asn | Leu | Asn | Arg | Pro 365 | Ala | Gly | Lys |
| Arg | Tyr 370 | Pro | Phe | Pro | Thr | Thr | Thr 375 | Gly | Asn | Ala | Val 380 | Ala | Ser | Gly | Met |

Met Asp Ala Val Cys Gly Ser Ile Met Met Met His Gly Arg Leu Lys
385 390 395 400

Glu Lys Asn Gly Ala Gly Lys Pro Val Asp Val Ile Ile Thr Gly Gly
405 410 415

Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala Phe Leu Ala Glu
420 425 430

Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile His Gly Leu Leu Asn
435 440 445

Leu Ile Ala Ala Glu Gly Gly Glu Ser Glu His Ala
450 455 460

<210> 40

<211> 1383

<212> DNA

<213> Neisseria gonorrhoeae

<400> 40

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gaaacgcaaa tcaagtggcc aaacgatttg gtcgtcggac gcgacaaatt gggcggcatt 180
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gccaaccgcg accacggcaa ggcggtattg ctggtgcgcg acggcgaaac cgtgtgcgaa 480
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taa 1383

```

<210> 41

<211> 244

<212> PRT

<213> Porphyromonas gingivalis

<400> 41

Met Ser Phe Asn Leu Ile Val Asp Gln Gly Asn Ser Ala Cys Lys Val
1 5 10 15

Ala Phe Val Arg Asn Asn Ser Ile Glu Ser Ile Ser Phe Leu Pro Gly
20 25 30

Lys Ala Gly Gln Ala Leu Ser His Leu Val Ala Pro His Arg Phe Asp

| 35 | | | | | 40 | | | | | 45 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Ala | Ile | Tyr | Ser | Ser | Val | Gly | Leu | Pro | Asp | Glu | Glu | Ala | Glu | Ala |
| 50 | | | | | | 55 | | | | | 60 | | | | |
| Ile | Val | Arg | Ser | Cys | Ala | Ala | Ala | Ser | Leu | Met | Met | Gly | Thr | Glu | Thr |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Pro | Val | Pro | Leu | Arg | Leu | Gln | Tyr | Asp | Arg | Arg | Thr | Leu | Gly | Ala | Asp |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Arg | Leu | Ala | Ala | Val | Val | Gly | Ala | His | Ser | Leu | Tyr | Pro | Asn | Thr | Glu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Leu | Val | Ile | Asp | Ala | Gly | Thr | Ala | Ile | Thr | Tyr | Glu | Arg | Val | Ser |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Ala | Glu | Gly | Ile | Tyr | Leu | Gly | Gly | Asn | Ile | Ser | Pro | Gly | Leu | His | Leu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Arg | Phe | Lys | Ala | Leu | His | Leu | Phe | Thr | Gly | Arg | Leu | Pro | Leu | Ile | Asp |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Pro | Ser | Gly | Ile | Ser | Pro | Lys | Ile | Ala | Glu | Tyr | Gly | Ser | Ser | Thr | Glu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Glu | Ala | Ile | Thr | Ala | Gly | Val | Ile | His | Gly | Leu | Ala | Gly | Glu | Ile | Asp |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Arg | Tyr | Ile | Asp | Asp | Leu | His | Ala | Lys | Glu | Gly | Arg | Ser | Ala | Val | Ile |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Leu | Thr | Gly | Gly | Asp | Ala | Asn | Tyr | Leu | Ala | Arg | Ile | Ile | Arg | Ser | Gly |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ile | Leu | Ile | His | Pro | Asp | Leu | Val | Leu | Leu | Gly | Leu | Asn | Arg | Ile | Leu |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Glu | Tyr | Asn | Val | | | | | | | | | | | | |

<210> 42

<211> 735

<212> DNA

<213> Porphyromonas gingivalis

<400> 42

```

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ctcgtcgctc ctcaccgttt cgacaaggct atctactcat ctgtggggct tcccgaacga 180
gaggctgaag ctattgtgag aagttgtgca gctgcttcc tcatgatggg gactgagacc 240
cccgatcccc ttcgcctgca atatgatcgc cgcactttgg gtgccgaccg actggctgcg 300
gtggctggag cgcatagtct ctatccgaat accgaattgc tggatgatcg cgcgggtact 360
gccatcactt atgaacgagt atccgctgaa gggatctatc tcgggtggcaa tatatcgccc 420
ggctctccact tgcgcttcaa ggctcttcat ctctttacgg gcaggctccc cctgattgat 480
ccttcgggta tctctccgaa aatagccgag tatggctcct cgaccgaaga agcgatcaca 540
gccggagtaa ttcattggcct ggcaggggag atagacagat atattgacga tctgcacgct 600
aaagaggggc ggtctgccgt tatactgacc ggaggagatg ccaactatctt ggcacggatt 660
ataagaagcg gaataactaat tcatcccgat ttagtacttt tgggcctaaa tagaatttta 720
gaatataatg tataa 735

```

<210> 43
 <211> 592
 <212> PRT
 <213> Neisseria meningitidis

<400> 43
 Met Thr Val Leu Lys Leu Ser His Trp Arg Val Leu Ala Glu Leu Ala
 1 5 10 15
 Asp Gly Leu Pro Gln His Val Ser Gln Leu Ala Arg Met Ala Asp Met
 20 25 30
 Lys Pro Gln Gln Leu Asn Gly Phe Trp Gln Gln Met Pro Ala His Ile
 35 40 45
 Arg Gly Leu Leu Arg Gln His Asp Gly Tyr Trp Arg Leu Val Arg Pro
 50 55 60
 Leu Ala Val Phe Asp Ala Glu Gly Leu Arg Glu Leu Gly Glu Arg Ser
 65 70 75 80
 Gly Phe Gln Thr Ala Leu Lys His Glu Cys Ala Ser Ser Asn Asp Glu
 85 90 95
 Ile Leu Glu Leu Ala Arg Ile Ala Pro Asp Lys Ala His Lys Thr Ile
 100 105 110
 Cys Val Thr His Leu Gln Ser Lys Gly Arg Gly Arg Gln Gly Arg Lys
 115 120 125
 Trp Ser His Arg Leu Gly Glu Cys Leu Met Phe Ser Phe Gly Trp Val
 130 135 140
 Phe Asp Arg Pro Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala
 145 150 155 160
 Val Ala Cys Arg Arg Ala Leu Ser Arg Leu Gly Leu Asp Val Gln Ile
 165 170 175
 Lys Trp Pro Asn Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile
 180 185 190
 Leu Ile Glu Thr Val Arg Thr Gly Gly Lys Thr Val Ala Val Val Gly
 195 200 205
 Ile Gly Ile Asn Phe Val Leu Pro Lys Glu Val Glu Asn Ala Ala Ser
 210 215 220
 Val Gln Ser Leu Phe Gln Thr Ala Ser Arg Arg Gly Asn Ala Asp Ala
 225 230 235 240
 Ala Val Leu Leu Glu Thr Leu Leu Val Glu Leu Asp Ala Val Leu Leu
 245 250 255
 Gln Tyr Ala Arg Asp Gly Phe Ala Pro Phe Val Ala Glu Tyr Gln Ala
 260 265 270
 Ala Asn Arg Asp His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu
 275 280 285

| | |
|-------|------|
| <210> | 44 |
| <211> | 1779 |
| <212> | DNA |

DATE _____ TIME _____

<213> *Neisseria meningitidis*

<400> 44

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atgacggttt tgaagctttc gcaactggcgg gtgttggcgg agcttgccga cggtttgccg 60
caacacgtct cgcaactggc gcgtatggcg gatatgaagc cgcagcagct caacggtttt 120
tggcagcaga tgccggcgca catacgcggg ctgttgcgcc aacacgacgg ctattggcgg 180
ctggtgcgcc cattggcggt ttctgatgcc gaaggtttgc gcgagctggg ggaaaggtcg 240
ggttttcaga cggcattgaa gcacgagtgc gcgtccagca acgacgagat actggaattg 300
gcgcggtatt cgccgggaaa ggcgcacaaa accatatgcg tgaccacact gcaaagtaag 360
ggcagggggc ggcagggggc gaagtggtcg caccgtttgg gcgagtgtct gatgttcagt 420
tttggctggg tgtttgaccg gccgcagtat gagttgggtt cgctgtcgcc tgttgcgcca 480
gtggcggtgc ggcgcgctt gtcgcgttta ggtttggatg tgcagattaa gtggcccaat 540
gattttggtt tcggacgcga caaattgggc ggcatctga ttgaaacggt caggacgggc 600
ggcaaaacgg ttgccgtggt cggtatcggc atcaattttg tcctgcccaa ggaagtagaa 660
aatgccgctt ccgtgcaatc gctgtttcag acggcatcgc ggcggggcaa tgccgatgcc 720
gccgtgctgc tggaaacgct gttggtggaa ctggacgcgg tgttgttgca atatgcgcgg 780
gacggatttg cgccttttgt ggcggaatat caggctgcca accgcgacca cggcaaggcg 840
gtattgctgt tgcgcgacgg cgaaaccgtg ttcgaaggca cggttaaagg cgtggacgga 900
caaggcggtt tgcacttgga aacggcagag ggcaaacaga cggtcgtcag cggcgaaatc 960
agcctgcggt ccgacgacag gccggtttcc gtgccgaagc ggcggggattc ggaacgtttt 1020
ctgctgttgg acggcggcaa cagccggctc aagtgggctg ggggtggaaa cggcacgttc 1080
gcaaccgtcg gtagcgcgcc gtaccgcgat ttgtcgctt tgggcgcgga gtgggcgga 1140
aaggcggtat gaaatgtccg catcgtcggt tgcgctgtgt gcggagaatt caaaaaggca 1200
caagtgcagg aacagctcgc ccgaaaaatc gagtggctgc cgtcttccgc acaggctttg 1260
ggcatacgca accactaccg ccaccccga gaacacggtt ccgaccgtg gttcaacgcc 1320
ttgggcagcc gccgtttcag ccgcaacgcc tgcgtcgctg tcagttgcgg caccgcggtg 1380
acggttgacg cgctcacgga tgacggacat tatctcgggg gaaccatcat gcccggttc 1440
cacctgatga aagaatcgct cgccgtccga accgccaaac tcaaccggca cgccggtgaa 1500
cgttatcctt tcccgaccac aacgggcaat gccgtcgcca gcggcatgat ggatgcggtt 1560
tgcggtcggg ttatgatgat gcacgggctg ttgaaagaaa aaaccggggc gggcaagcct 1620
gtcgatgtca tcattaccgg cggcggcgcg gcaaaagttg ccgaagccct gccgcctgca 1680
tttttgcgcg aaaataccgt gcgcgtggcg gacaacctcg tcatttacgg gttgttgaac 1740
atgattgccg ccgaaggcag ggaatatgaa catatttaa 1779

```

<210> 45

<211> 262

<212> PRT

<213> *Bacillus anthracis*

<400> 45

```

Met Ile Phe Val Leu Asp Val Gly Asn Thr Asn Ala Val Leu Gly Val
  1             5             10             15

Phe Glu Glu Gly Glu Leu Arg Gln His Trp Arg Met Glu Thr Asp Arg
      20             25             30

His Lys Thr Glu Asp Glu Tyr Gly Met Leu Val Lys Gln Leu Leu Glu
      35             40             45

His Glu Gly Leu Ser Phe Glu Asp Val Lys Gly Ile Ile Val Ser Ser
      50             55             60

Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Glu Lys Tyr
      65             70             75             80

Phe Lys Ile Lys Pro Leu Val Val Gly Pro Gly Ile Lys Thr Gly Leu
      85             90             95

Asn Ile Lys Tyr Glu Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val
      100            105            110

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Ala | Val | Ala | Gly | Ile | His | Leu | Tyr | Gly | Ser | Pro | Leu | Ile | Ile | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Phe | Gly | Thr | Ala | Thr | Thr | Tyr | Cys | Tyr | Ile | Asn | Glu | Glu | Lys | His |
| | | 130 | | | | | 135 | | | | | 140 | | | |
| Tyr | Met | Gly | Gly | Val | Ile | Thr | Pro | Gly | Ile | Met | Ile | Ser | Ala | Glu | Ala |
| | | 145 | | | 150 | | | | | | | 155 | | | 160 |
| Leu | Tyr | Ser | Arg | Ala | Ala | Lys | Leu | Pro | Arg | Ile | Glu | Ile | Thr | Lys | Pro |
| | | | | 165 | | | | | | | 170 | | | 175 | |
| Ser | Ser | Val | Val | Gly | Lys | Asn | Thr | Val | Ser | Ala | Met | Gln | Ser | Gly | Ile |
| | | | | 180 | | | | | | | 185 | | | 190 | |
| Leu | Tyr | Gly | Tyr | Val | Gly | Gln | Val | Glu | Gly | Ile | Val | Lys | Arg | Met | Lys |
| | | | | 195 | | | | | | | | | 205 | | |
| Glu | Glu | Ala | Lys | Gln | Glu | Pro | Lys | Val | Ile | Ala | Thr | Gly | Gly | Leu | Ala |
| | | | | | | 215 | | | | | | | 220 | | |
| Lys | Leu | Ile | Ser | Glu | Glu | Ser | Asn | Val | Ile | Asp | Val | Val | Asp | Pro | Phe |
| | | | | | | 230 | | | | | | | 235 | | |
| Leu | Thr | Leu | Lys | Gly | Leu | Tyr | Met | Leu | Tyr | Glu | Arg | Asn | Ala | Asn | Leu |
| | | | | | | 245 | | | | | | | 250 | | |
| Gln | His | Glu | Lys | Gly | Glu | | | | | | | | | | |
| | | | | | | 260 | | | | | | | | | |

```
<210> 46
<211> 789
<212> DNA
<213> Bacillus anthracis
```

| | | | | | | | |
|-------------|------------|-------------|-------------|------------|------------|-----|--|
| <400> | 46 | | | | | | |
| atgattttttg | tattggatgt | agggaaacaca | aatgctgtac | tgggcgtgtt | tgaagagggg | 60 | |
| gaacttcgtc | aacattggcg | catggaaaca | gatcgtcata | agacagaaga | tgaatatgga | 120 | |
| atgcttgtga | agcagttgct | tgagcatgag | ggtctttctg | ttgaagatgt | gaaaggtatt | 180 | |
| atcgtatctt | cagtcgtgcc | accaattatg | tttgcttttag | agcgcattgt | tgaaaagtat | 240 | |
| tttaaaatta | agccgcttgt | agtaggtcct | ggaataaaaa | cggggctaaa | tattaaatat | 300 | |
| gaaaattccac | gtgaagtgtg | tgcggatcga | atcgtaaatt | cagtagcagg | gatccactta | 360 | |
| tatggaagtc | cgcttattat | tgtcgaattt | ggtacggcta | ctacatatgt | ttatattaac | 420 | |
| gaagaaaagc | attatatggg | tggagttatt | acaccgggaa | ttatgatttc | agcagaggct | 480 | |
| ttatatagta | gagccgcaaa | acttcctcgt | attgaaatta | caaaaccaag | cagtgtagtt | 540 | |
| gggaagaata | cggtaagtgc | gatgcaatct | ggtattcttt | atggttatgt | tggacaagtg | 600 | |
| gaaggtattg | ttaagcgcac | gaaagaggaa | gctaacaacg | aaccgaaagt | tattgcaaca | 660 | |
| ggtggatttg | cgaaattaat | ttcagaagaa | tcgaatgtga | ttgatgttgt | agatccattt | 720 | |
| ttaacatttaa | aaggtttgta | tatgtttata | gagcgggaat | caaatttaca | gcatgagaaa | 780 | |
| ggtgaataa | | | | | | 789 | |

```
<210> 47
<211> 254
<212> PRT
<213> Bacillus halodurans
```

<400> 47
Met Ile Leu Val Ile Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val
1 5 10 15

Tyr Gln Asp Glu Thr Leu Val His His Trp Arg Leu Ala Thr Ser Arg
 20 25 30
 Gln Lys Thr Glu Asp Glu Tyr Ala Met Thr Val Arg Ser Leu Phe Asp
 35 40 45
 His Ala Gly Leu Gln Phe Gln Asp Ile Asp Gly Ile Val Ile Ser Ser
 50 55 60
 Val Val Pro Pro Met Met Phe Ser Leu Glu Gln Met Cys Lys Lys Tyr
 65 70 75 80
 Phe His Val Thr Pro Met Ile Ile Gly Pro Gly Ile Lys Thr Gly Leu
 85 90 95
 Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val
 100 105 110
 Asn Ala Val Ala Ala Ile Glu Leu Tyr Gly Tyr Pro Ala Ile Val Val
 115 120 125
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Leu Ile Asn Glu Lys Lys Gln
 130 135 140
 Tyr Ala Gly Gly Val Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala
 145 150 155 160
 Leu Tyr His Arg Ala Ser Lys Leu Pro Arg Ile Glu Ile Ala Lys Pro
 165 170 175
 Lys Gln Val Val Gly Thr Asn Thr Ile Asp Ser Met Gln Ser Gly Ile
 180 185 190
 Phe Tyr Gly Tyr Val Ser Gln Val Asp Gly Val Val Lys Arg Met Lys
 195 200 205
 Ala Gln Ala Glu Ser Glu Pro Lys Val Ile Ala Thr Gly Gly Leu Ala
 210 215 220
 Lys Leu Ile Gly Thr Glu Ser Glu Thr Ile Asp Val Ile Asp Ser Phe
 225 230 235 240
 Leu Thr Leu Lys Gly Leu Gln Leu Ile Tyr Lys Lys Asn Val
 245 250

<210> 48

<211> 765

<212> DNA

<213> Bacillus halodurans

<400> 48

atgatacttg tcattgatgt tggaaataca aatactgtgt taggggtcta ccaagatgaa 60
 acgtagtgac atcattggcg gctagcgacg agtaggcaaa agaccgagga tgagtatgca 120
 atgacgggtgc gttctctctt tgatcatgca ggtctacagt ttcaagacat agacggcatt 180
 gtcatttcat ctgttggtccc accgatgatg ttttccttag agcaaagtgc caaaaaatac 240
 tttcatgtca ctccatgatg tattgggcct ggaattaaga caggcttaaa tattaagtat 300
 gacaatccaa aagagggttg ggccgatcga atcgtaaatg cagttgcagc gattgagtta 360
 tatggctacc ctgccattgt cgttgatttt ggaacagcaa caacatattg cttaattaat 420
 gaaaaaaaaa aatatgcagg gggagtcatt gctcctggaa tcatgatctc aacagaagcg 480
 ttgtatcatc gcgcatacaa attgccacgg attgaaatag cgaagccgaa acaagtcgta 540

```

gggacaaata cgattgattc gatgcaatca ggaatcttct acgggtatgt gagccaagtc 600
gatggtgttg tgaacgaat gaaggctcaa gcagaaagtg aaccgaaagt cattgcaact 660
ggtgggcttg cgaagttaat cggaaccgag tcggaaacca ttgatgtaat cgattcgttt 720
ttaacattaa aaggattgca actcatttat aagaagaatg tctga 765

```

<210> 49

<211> 258

<212> PRT

<213> Bacillus stearothermophilus

<400> 49

```

Met Ile Phe Val Leu Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val
  1             5             10             15

```

```

Tyr Asp Gly Asp Glu Leu Lys His His Trp Arg Ile Glu Thr Ser Arg
          20             25             30

```

```

Ser Lys Thr Glu Asp Glu Tyr Gly Met Met Ile Lys Ala Leu Leu Asn
          35             40             45

```

```

His Val Gly Leu Gln Phe Ser Asp Ile Arg Gly Ile Ile Ile Ser Ser
          50             55             60

```

```

Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Leu Lys Tyr
          65             70             75             80

```

```

Phe His Ile Lys Pro Leu Ile Val Gly Pro Gly Ile Lys Thr Gly Leu
          85             90             95

```

```

Asp Ile Lys Tyr Asp Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val
          100             105             110

```

```

Asn Ala Val Ala Gly Ile His Leu Tyr Gly Ser Pro Leu Ile Ile Val
          115             120             125

```

```

Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asn Glu His Lys Gln
          130             135             140

```

```

Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala
          145             150             155             160

```

```

Leu Phe Ala Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Ala Arg Pro
          165             170             175

```

```

Asp Asp Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ala Gly Ile
          180             185             190

```

```

Leu Tyr Gly Tyr Val Gly Gln Val Glu Gly Ile Val Ser Arg Met Lys
          195             200             205

```

```

Ala Lys Ser Lys Ile Pro Pro Lys Val Ile Ala Thr Gly Gly Leu Ala
          210             215             220

```

```

Pro Leu Ile Ala Ser Glu Ser Asp Ile Ile Asp Val Val Asp Pro Phe
          225             230             235             240

```

```

Leu Thr Leu Thr Gly Leu Lys Leu Leu Tyr Glu Lys Asn Thr Glu Lys
          245             250             255

```

Lys Gly

"GATC" CATGTTT

<210> 50
 <211> 777
 <212> DNA
 <213> *Bacillus stearothermophilus*

<400> 50
 atgatttttg tattggacgt cggcaatata aacacggtgt taggggtgta tgacggggac 60
 gaactgaaac atcattggcg cattgaaaca agccgctcga aaacggaaga cgaatacggc 120
 atgatgatca aagcgctctt gaaccatgtc ggcttgcaat tttccgacat tcgaggcatc 180
 atcattttcct cggtcgtgcc gccgattatg tttgctcttg aacgcatgtg tctaaaatat 240
 ttccatatca aaccgctcat cgtcgggtccg ggcattataaa ccgggctcga catcaaatat 300
 gacaatccgc gtgaggtggg cggcgaccgc attgtcaacg cggttgccgg catccatttg 360
 tacggcagtc cgtcgattat cgtcgatttt ggcacggcga cgacgtattg ttatattaat 420
 gaacataaac aatatatggg aggggccatt gcccgggaa ttatgatctc gacagaggct 480
 ctgtttgccg gggcggcgaa attgccgcgc attgaaatcg cccgcccga tgatatcatc 540
 ggcaaaaata cggtcagcgc catgcaagcc ggtattttat acggttatgt cggacaagtg 600
 gaaggcatcg tgtcggaat gaaggcgaaa agcaaaatcc cgccgaaggt gattgctact 660
 ggcggtttgg ctccgctcat tgccagcgaa tcggacatca tcgatgtcgt tgatccggtt 720
 ttgacgctga ctggcttaaa attgttgtac gagaaaaaca ccgagaaaaa aggatga 777

<210> 51
 <211> 260
 <212> PRT
 <213> *Caulobacter crescentus*

<400> 51
 Met Leu Leu Ala Ile Glu Gln Gly Asn Thr Asn Thr Met Phe Ala Ile
 1 5 10 15
 His Asp Gly Ala Ser Trp Val Ala Gln Trp Arg Ser Ala Thr Glu Ser
 20 25 30
 Thr Arg Thr Ala Asp Glu Tyr Val Val Trp Leu Ser Gln Leu Leu Ser
 35 40 45
 Met Gln Gly Leu Gly Phe Arg Ala Ile Asp Ala Val Ile Ile Ser Ser
 50 55 60
 Val Val Pro Gln Ser Ile Phe Asn Leu Arg Asn Leu Ser Arg Arg Tyr
 65 70 75 80
 Phe Asn Val Glu Pro Leu Val Ile Gly Glu Asn Ala Lys Leu Gly Ile
 85 90 95
 Asp Val Arg Ile Glu Lys Pro Ser Glu Ala Gly Ala Asp Arg Leu Val
 100 105 110
 Asn Ala Ile Gly Ala Ala Met Val Tyr Pro Gly Pro Leu Val Val Ile
 115 120 125
 Asp Ser Gly Thr Ala Thr Thr Phe Asp Ile Val Ala Ala Asp Gly Ala
 130 135 140
 Phe Glu Gly Gly Ile Ile Ala Pro Gly Ile Asn Leu Ser Met Gln Ala
 145 150 155 160
 Leu His Glu Ala Ala Ala Lys Leu Pro Arg Ile Ala Ile Gln Arg Pro
 165 170 175

PUBMED ESTD 1980

```

<400> 53
Met Arg Leu Val Val Asp Ile Gly Asn Thr Ser Thr Thr Leu Ala Ile
  1             5             10             15

Phe Thr Gly Asp Glu Glu Pro Ser Val Glu Ser Val Pro Ser Ala Leu
             20             25             30

Phe Ala Asp Ser Ser Thr Met Arg Glu Val Phe Gly Asn Met Ala Arg
             35             40             45

Lys His Gly Glu Pro Gln Ala Ile Ala Ile Cys Ser Val Val Pro Ser
  50             55             60

Ala Thr Ala Val Gly Ser Ala Leu Leu Glu Ser Leu Phe Ser Val Pro
  65             70             75             80

```

Val Leu Thr Ile Cys Cys Lys Leu Arg Phe Pro Phe Arg Leu Asp Tyr
85 90 95

Ala Thr Pro His Thr Phe Gly Ala Asp Arg Leu Ala Leu Cys Ala Trp
100 105 110

Ser Arg His Leu Phe Ser Glu Lys Pro Val Ile Ala Val Asp Ile Gly
115 120 125

Thr Ala Ile Thr Phe Asp Val Leu Asp Thr Val Gly Asn Tyr Arg Gly
130 135 140

Gly Leu Ile Met Pro Gly Ile Asp Met Met Ala Gly Ala Leu His Ser
145 150 155 160

Arg Thr Ala Gln Leu Pro Gln Val Arg Ile Asp Arg Pro Glu Ser Leu
165 170 175

Leu Gly Arg Ser Thr Thr Glu Cys Ile Lys Ser Gly Val Phe Trp Gly
180 185 190

Val Val Lys Gln Ile Gly Gly Leu Val Asp Ala Ile Arg Gly Asp Leu
195 200 205

Val Arg Asp Phe Gly Glu Ser Thr Val Glu Val Ile Val Thr Gly Gly
210 215 220

Asn Ser Arg Ile Ile Val Pro Glu Ile Gly Pro Val Ser Val Ile Asp
225 230 235 240

Glu Leu Ala Val Leu Arg Gly Ser Asp Leu Leu Leu Arg Met Asn Met
245 250 255

Pro

<210> 54
<211> 774
<212> DNA
<213> Chlorobium tepidum

<400> 54
gtgcggctgg tcgttgacat cggcaatacc agcacgacgt tggcgatttt caccggtgat 60
gaagagccgt cggtcgagtc ggtaccgagt gcgttgtttg ccgattccag cacaatgcgc 120
gaagtgtttg gcaacatggc ccggaagcac ggcgagccac aggccatcgc catttgcagc 180
gtggtgcctt ccgctaccgc cgtcggttcg gcgcttctcg aatcactttt ctccgtaccg 240
gtgctgacca tctgctgtaa gtcctgtttt ccttttcgtc tcgactacgc aaccccgcac 300
accttcggcg cggatcgctt tgccctgtgc gcatggagcc gacatctctt ttctgaaaaa 360
ccggttatcg ccgtcgatat cggcacggcc atcaccttcg acgtgctcga cacggtgggg 420
aattatcgcg gtggtctcat catgccgggt atcgacatga tggccggagc gcttcattcg 480
agaaccgccc agcttcccca ggtgcgcacg gacaggccgg agagccttct cgggcgctcg 540
acgaccgaat gcatcaaaag cggagttttc tggggagtgg tcaaacagat cggcggcctc 600
gtggacgcca ttgcgcgcca ccttgtagcg gactttggcg agtcaacggt cgaagtgatt 660
gtcaccggcg gcaatagcag gattatcggt ccggagatcg gccctgtcag tgttatcgac 720
gaactcgctg tctgcgcgcg cagcgatctt ttgctgcgga tgaatatgcc gtga 774

<210> 55
<211> 256
<212> PRT
<213> Clostridium difficile

```
<210> 56
<211> 771
<212> DNA
<213> Clostridium difficile
```

| | | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|--|
| <400> | 56 | | | | | | |
| atgcttctag | tatttgatgt | tggaaatact | aatatggttt | taggtatata | taaaggtgac | 60 | |
| aaattagtta | attactggag | aattaaaaca | gatagggaaa | aaacgtctga | tgaatatgga | 120 | |
| atcctgataa | gtaaccttat | tgattatgat | aatgtgaata | taagtgatat | tgatgatggt | 180 | |
| ataatatcat | ctgtagttcc | gaatgttatg | catctctctg | aaaacttttg | tataaagtac | 240 | |


```
<210> 57
<211> 219
<212> PRT
<213> Dehalococcoides ethenogenes
```

Arg Ile Gln Thr Glu Leu Gly Gln Lys Thr Arg
210 215

| | |
|-------|-----|
| <210> | 58 |
| <211> | 659 |

<212> DNA

<213> Dehalococcoides ethenogenes

<400> 58

```

atgtctgaaa aactggtggc ggtagatata ggcaatacca gcgtaaatat aggtatatatt 60
gagggcgaaa aactgctggc aaactggcat ctgggttcgg ttgcccagcg tatggctgat 120
gaatatgcca gtctgtctctt aggcctgttg cagcacgccg gtatacaccg ggaagagcta 180
aacagggtaa tcatgtgcag tgttgtgccg cccctgacca ctacttttga agaggatatt 240
aaaagctatt tcaaggctgc tcctctggta gtgggtgcag gtataaagag cgggggttaag 300
gtgcgcatgg ataacccccg tgaggttggg gctgaccgca tagtaaatac cgctgccgcc 360
agggtgcttt atccggggggc gtgcataata gtggacatgg gtacggccac tacctttgat 420
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gccaggcta ttgcggaaaa gacttcaaaa ctgcccaaga ttgagataat ccgtcctgcc 540
aaagttatcg gctctaatac tgtgtcggct atgcagtcag gtatatactt cggttatatc 600
gggctggtgg aagagctggt caggcggatt caaactgaat tggggcagaa aaccagagt 659

```

<210> 59

<211> 212

<212> PRT

<213> Desulfovibrio vulgaris

<400> 59

```

Met Thr Gln His Phe Leu Leu Phe Asp Ile Gly Asn Thr Asn Val Lys
  1             5             10             15

Ile Gly Ile Ala Val Glu Thr Ala Val Leu Thr Ser Tyr Val Leu Pro
      20             25             30

Thr Asp Pro Gly Gln Thr Thr Asp Ser Ile Gly Leu Arg Leu Leu Glu
      35             40             45

Val Leu Arg His Ala Gly Leu Gly Pro Ala Asp Val Gly Ala Cys Val
      50             55             60

Ala Ser Ser Val Val Pro Gly Val Asn Pro Leu Ile Arg Arg Ala Cys
      65             70             75             80

Glu Arg Tyr Leu Tyr Arg Lys Leu Leu Phe Ala Pro Gly Asp Ile Ala
      85             90             95

Ile Pro Leu Asp Asn Arg Tyr Glu Arg Pro Ala Glu Val Gly Ala Asp
      100            105            110

Arg Leu Val Ala Ala Tyr Ala Ala Arg Arg Leu Tyr Pro Gly Pro Arg
      115            120            125

Ser Leu Val Ser Val Asp Phe Gly Thr Ala Thr Thr Phe Asp Cys Val
      130            135            140

Glu Gly Gly Ala Tyr Leu Gly Gly Leu Ile Cys Pro Gly Val Leu Ser
      145            150            155            160

Ser Ala Gly Ala Leu Ser Ser Arg Thr Ala Lys Leu Pro Arg Ile Ser
      165            170            175

Leu Glu Val Glu Glu Asp Ser Pro Val Ile Gly Arg Ser Thr Thr Thr
      180            185            190

Ser Leu Asn His Gly Phe Ile Phe Gly Phe Ala Ala Met Thr Glu Gly
      195            200            205

```

Val Leu Ala Ala
210

<210> 60

<211> 639

<212> DNA

<213> Desulfovibrio vulgaris

<400> 60

```

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tccatcgggc tgcgcctgct ggaggtgctg cgccatgccg ggctgggacc ggcggacgtg 180
ggggcctgcg tggccagttc ggtggtgccc ggcgtcaacc cgctgatccg ccgcgcctgc 240
gaacgttacc tgtatcgcaa gctgctgttc gccccggcg acatcgccat tccgctggac 300
aacgcgtacg aacggcccg cgaagtgggc gcgaccggc tggtggcggc ctatgccgcc 360
cggcggtgtg acccgggcc ccggtcgctg gtatccgtgg atttcggcac cgccaccacg 420
tttgactgcg tggaggggg tgcgtatctt ggtggtttga tctgtcccgg cgtgctgtcg 480
tccgccgggg cgttgctgct gcgcacggcc aagctgccgc gcatcagtct ggaagtggaa 540
gaggattcgc cggtcacg gcggtccacc accaccagcc tgaaccacgg cttcattttc 600
ggctttgccc ccatgaccga aggggtgctg gccgcctga 639

```

<210> 61

<211> 249

<212> PRT

<213> Pseudomonas putida

<400> 61

```

Met Ile Leu Glu Leu Asp Cys Gly Asn Ser Phe Ile Lys Trp Arg Val
  1             5             10             15

Ile His Val Ala Asp Ala Val Ile Glu Gly Gly Gly Ile Val Asp Ser
      20             25             30

Asp Gln Ala Leu Val Ala Glu Val Ala Ala Leu Ala Ser Val Arg Leu
      35             40             45

Thr Gly Cys Arg Ile Val Ser Val Arg Ser Glu Glu Glu Thr Asp Ala
      50             55             60

Leu Cys Ala Leu Ile Ala Gln Ala Phe Ala Val Gln Ala Lys Val Ala
      65             70             75             80

His Pro Val Arg Glu Met Ala Gly Val Arg Asn Gly Tyr Asp Asp Tyr
      85             90             95

Gln Arg Leu Gly Met Asp Arg Trp Leu Ala Ala Leu Gly Ala Phe His
      100            105            110

Leu Ala Lys Gly Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Ala Lys
      115            120            125

Ala Asp Phe Val Ser Ala Asp Gly Glu His Leu Gly Gly Tyr Ile Cys
      130            135            140

Pro Gly Met Pro Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg
      145            150            155            160

Ile Arg Tyr Asp Asp Ala Ser Ala Glu Arg Ala Leu Ser Ser Leu Ser
      165            170            175

Pro Gly Arg Ser Thr Val Glu Ala Val Glu Arg Gly Cys Val Leu Met

```

Pseudomonas putida

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 180 | | | | | | | 185 | | | | | 190 | | | | |
| Leu | Gln | Gly | Phe | Ala | Tyr | Thr | Gln | Leu | Glu | Gln | Ala | Arg | Val | Leu | Trp | |
| 195 | | | | | | | 200 | | | | | 205 | | | | |
| Gly | Glu | Glu | Phe | Thr | Val | Phe | Leu | Thr | Gly | Gly | Asp | Ala | Pro | Leu | Val | |
| 210 | | | | | | | 215 | | | | | 220 | | | | |
| Arg | Ala | Ala | Leu | Pro | Gln | Ala | Arg | Val | Val | Pro | Asp | Leu | Val | Phe | Val | |
| 225 | | | | | | | 230 | | | | | 235 | | | | |
| Gly | Leu | Ala | Met | Ala | Cys | Pro | Leu | Asp | | | | | | | | |
| 245 | | | | | | | | | | | | | | | | |

```
<210> 62
<211> 750
<212> DNA
<213> Pseudomonas putida
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| <400> | 62 | | | | | | |
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| gatgctgtga | ttgaaggttg | tgggatcgtc | gattccgata | aggcgctgg | ggcggaagtg | 120 | |
| gctgcgctcg | cttcagtgcg | tctcacgggt | tgccgtattg | tcagtggtcg | cagcgaagaa | 180 | |
| gagaccgatg | cgctttgcgc | gttgattgct | caggcatttg | ccgtgcaggc | gaaggttgcc | 240 | |
| caccctgtcc | gtgaaattgc | aggtgtgcgc | aatggctatg | acgactatca | gcgcctgggt | 300 | |
| atggatcggt | ggctggcgcc | gttgggggca | ttcacctgg | ccaagggcgc | gtgcctggtg | 360 | |
| attgacctgg | gtaccgcggc | aaaagcggac | ttcgtttctg | cagatggcga | gcattctggg | 420 | |
| ggctacatct | gcccagggtat | gccattgatg | cgtagccagc | tgcgcactca | caccgcgtcg | 480 | |
| atccgctatg | acgatgcctc | cgcgagcgc | gcattgagca | gcttgctacc | aggtcgctcg | 540 | |
| actgtcgaag | cggtagagcg | cggttgcgta | ttgatgctcc | agggctttgc | ctacaccgag | 600 | |
| cttgagcagg | ctcgtgtgct | atggggtgag | gagttcaccc | tgttctctac | tggcggtgat | 660 | |
| gcgcactgg | tgagggcgcc | cctgccacag | gcgcgggtcg | tgcctgacct | ggttttcgtt | 720 | |
| ggcctagcaa | tggcttqtcc | attgattga | | | | 750 | |

```
<210> 63
<211> 241
<212> PRT
<213> Thiobacillus ferrooxidans
```

| | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 63 | | | | | | | | | | | | | | | |
| Met | Ile | Phe | Ile | Ala | Val | Gly | Asn | Thr | Arg | Thr | Leu | Leu | Ala | His | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| His | Asp | Gly | Val | His | Phe | Asp | Ser | Val | Ser | Val | Ala | Thr | Ser | Leu | Pro |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Pro | Thr | Glu | Ile | Leu | Gln | Gln | Pro | Gly | Leu | Thr | Trp | Leu | Ser | Ala | Pro |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asn | Arg | Glu | Pro | Val | Ala | Leu | Gly | Gly | Val | Val | Pro | Ala | Ala | Leu | Ala |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Ala | Trp | Arg | Glu | Ala | Leu | Ala | Thr | Ala | Glu | Val | Arg | Glu | Pro | Asp | Pro |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Gly | Phe | Phe | Arg | Arg | Ala | Val | Pro | His | Asp | Tyr | His | Pro | Pro | Glu | Ser |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Leu | Gly | Phe | Asp | Arg | Arg | Cys | Cys | Leu | Leu | Ala | Ala | Ala | Met | Asp | Tyr |
| | | | 100 | | | | | 105 | | | | | 110 | | |

[illegible]

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<210> 64
<211> 726
<212> DNA
<213> Thiobacillus ferrooxidans
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[illegible]

```
<210> 65
<211> 242
<212> PRT
<213> Xylessa fastidiosa
```

```
<400> 65
Met Asn Asp Trp Leu Phe Asp Leu Gly Asn Ser Arg Phe Lys Cys Ala
  1                   5             10             15
```

Ser Leu Arg Glu Gly Val Ile Gly Pro Val Thr Val Leu Pro Tyr Leu
20 25 30

Thr Glu Thr Met Asp Ala Phe Ala Leu Gln Glu Leu Pro Arg Gly Arg
 35 40 45
 Val Ala Tyr Leu Ala Ser Val Ala Ala Pro Ala Ile Thr Thr His Val
 50 55 60
 Leu Glu Val Leu Lys Ile His Phe Glu Gln Val Gln Val Ala Ala Thr
 65 70 75 80
 Val Ala Ala Cys Ala Gly Val Arg Ile Ala Tyr Ala His Pro Glu Arg
 85 90 95
 Phe Gly Val Asp Arg Phe Leu Ala Leu Leu Gly Ser Tyr Gly Glu Gly
 100 105 110
 Asn Val Leu Val Val Gly Val Gly Thr Ala Leu Thr Ile Asp Leu Leu
 115 120 125
 Ala Ala Asn Gly Cys His Leu Gly Gly Arg Ile Ser Ala Ser Pro Thr
 130 135 140
 Leu Met Arg Gln Ala Leu His Ala Arg Ala Glu Gln Leu Pro Leu Ser
 145 150 155 160
 Gly Gly Asn Tyr Leu Glu Phe Ala Glu Asp Thr Glu Asp Ala Leu Val
 165 170 175
 Ser Gly Cys Asn Gly Ala Ala Val Ala Leu Ile Glu Arg Ser Leu Tyr
 180 185 190
 Glu Ala His Gln Arg Leu Asp Gln Ser Val Arg Leu Leu Leu His Gly
 195 200 205
 Gly Gly Val Ala Ser Leu Leu Pro Trp Leu Gly Asp Val Val His Arg
 210 215 220
 Pro Thr Leu Val Leu Asp Gly Leu Ala Ile Trp Ala Ala Val Ala Ala
 225 230 235 240
 Asn Val

<210> 66
 <211> 729
 <212> DNA
 <213> Xylella fastidiosa

<400> 66
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 ttacaggagc taccacgtgg tcgtgtggct tacttgccga gtgtcgctgc tccggctatt 180
 actacacatg tgctcgaagt attaaaaatc cacttcgagc aagtccaggt ggctgcaacc 240
 gtcgctgcat gtgccggagt acgaattgcc tatgtccacc cggaacgttt tggagtggat 300
 aggttcttag cggtgcttgg ttcgtatggt gagggcaatg tcctggtagt ggggtgcggg 360
 acagcattga ctattgattt gttggctgcc aatggttgtc atctcggagg gcgtatcagt 420
 gcttcaccga cattgatgcg ccaagcgttg catgcacgcg cggagcaact cccctcagt 480
 ggtgggaact acttggagtt tgcggaagat acagaggatg cggttgggtgc aggggtgcaat 540
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 tcggttcgat tattgttgca tgggtggagg gtagcatctt tattgccttg gttgggcgac 660
 gtggtacatc gtcctacatt agtattggat ggcctggcga tctgggctgc cggtgcagct 720

aacgttttag

729

<210> 67

<211> 223

<212> PRT

<213> Helicobacter pylori

<400> 67

Met Pro Ala Arg Gln Ser Phe Thr Asp Leu Lys Asn Leu Val Leu Cys
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Asp Ile Gly Asn Thr Arg Ile His Phe Ala Gln Asn Tyr Gln Leu Phe
 20 25 30

Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile
 35 40 45

Phe Tyr Ile Ser Val Asn Glu Glu Asn Glu Lys Ala Leu Leu Asn Cys
 50 55 60

Tyr Pro Asn Ala Lys Asn Ile Ala Gly Phe Phe His Leu Glu Thr Asp
 65 70 75 80

Tyr Val Gly Leu Gly Ile Asp Arg Gln Met Ala Cys Leu Ala Val Asn
 85 90 95

Asn Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile Asp Leu Ile
 100 105 110

Lys Glu Gly Lys His Leu Gly Gly Cys Ile Leu Pro Gly Leu Ala Gln
 115 120 125

Tyr Ile His Ala Tyr Lys Lys Ser Ala Lys Ile Leu Glu Gln Pro Phe
 130 135 140

Lys Ala Leu Asp Ser Leu Glu Val Leu Pro Lys Ser Thr Arg Asp Ala
 145 150 155 160

Val Asn Tyr Gly Met Val Leu Ser Val Ile Ala Cys Ile Gln His Leu
 165 170 175

Ala Lys Asn Gln Lys Ile Tyr Leu Cys Gly Gly Asp Ala Lys Tyr Leu
 180 185 190

Ser Ala Phe Leu Pro His Ser Val Cys Lys Glu Arg Leu Val Phe Asp
 195 200 205

Gly Met Glu Ile Ala Leu Lys Lys Ala Gly Ile Leu Glu Cys Lys
 210 215 220

<210> 68

<211> 672

<212> DNA

<213> Helicobacter pylori

<400> 68

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 cgtttggtta ttcaaaagga aattttttac attagcgtga atgaagaaaa tgaaaaagcc 180
 cttttgaatt gttaccctaa cgctaaaaat attgcagggt tttttcattt agaaaccgac 240

```

tatgtagggc ttgggataga ccggcaaatg gcgtgtctgg cggtaaataa tggcgtgggtg 300
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gagcaacctt tcaaggcctt agattcttta gaagttttac ctaaaagcac tagagacgct 480
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aaaatctatc tttgtggggg cgatgcgaag tatttgagcg cgtttttacc ccattctgtt 600
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gaatgcaaat ga 672

```

<210> 69

<211> 8320

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: plasmid, pAN296

<400> 69

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ttaagttggg taacgccagg gttttccag tcacgacgtt gtaaaacgac ggccagtga 180
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gcatacttat gcgcggctga aggagcccat gtcctgctgt cggctagacg cgaggatcgt 540
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```


| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|--------------|------|
| ggtgctgatt | tgctaaaaaa | acgaaatgga | aaataagcag | acagtgaaaa | ggttttccgt | 2640 |
| tacaatcttt | gtaagggttt | taacctacag | agagtcaggt | gtaaacagt | aaaaataaag | 2700 |
| aacttaacct | acatacttta | tatacacagc | acaatcgga | gtcttctgca | gctcgagcaa | 2760 |
| tagttaccct | tattatcaag | ataagaaaga | aaaggatttt | tcgctacgct | caaatccttt | 2820 |
| aaaaaaacac | aaaagaccac | atTTTTtaat | gtgggtcttta | ttcttcaact | aaagcacc | 2880 |
| ttagttcaac | aaacgaaaat | tggataaagt | gggatatttt | taaaatatat | atTTatgtta | 2940 |
| cagtaatatt | gactttttaa | aaaggattga | ttctaataga | gaaagcagac | aagtaagcct | 3000 |
| cctaaattca | ctttagataa | aaatttagga | ggcataatcaa | atgaacttta | ataaaattga | 3060 |
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| taaattttac | cctgcattta | ttttcttagt | gācaagggtg | ataaactcaa | atacagcttt | 3240 |
| tagaactggt | tacaatagcg | acggagaggt | aggttattgg | gataagttag | agccacttta | 3300 |
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| acatcattct | gttttgtgatg | ggttatctgc | aggattgttt | atgaactcta | tctcaggaatt | 3660 |
| gtcagatagg | cctaattgact | ggctttttata | atatgagata | atgccgactg | tactttttac | 3720 |
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| aaattgacgt | caaaaggcta | tcgtgtgttg | taccgagaca | ggcatccttt | tgccggagga | 4140 |
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| tgcgcttttc | ggtttttctgc | atacttgaag | cctgtaacag | ccgcaaagac | gacagcggca | 4320 |
| aatataataa | atacaaacag | ctgaaacatc | acatcaccta | tattcatggt | cttcacctca | 4380 |
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| aacggtgttt | tgtggtctcc | atTTtcatTT | gccgataggc | gaacgctaaa | aatggcaggc | 4500 |
| cgagcagggt | aatgcgcgtc | aggacagaaa | aaatataaat | cgccgggcca | gcgcaaaaca | 4560 |
| ggtctataca | tatccccccg | acccaagggc | cgatgacgtt | tccgagctgt | ggaaaaaccga | 4620 |
| ttgccccgaa | ataagtgcct | tttaatctcg | gttttgcaat | ctgggtctaca | tacaaatcca | 4680 |
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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: plasmid, pAN336

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SEQ ID NO:69 *Pseudomonas syringae* pv *tomato* *coaX* coding sequence

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SEQ ID NO:70 *Pseudomonas syringae* pv *tomato* *coaX* protein sequence

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SEQ ID NO:72 - pAN336

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